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ABSTRACT

A study of cooperative education in the United States was made during the period of July 1975 through November 1977 to determine: (1) the degree to which it is a viable educational and/or financial aid mechanism for higher education institutions to adopt; and (2) the effectiveness of the federal role in supporting it. In this volume are contained two segments of the final report: (1) an introduction and overview of cooperative education, discussing the scope of the study and the nature of cooperative education and containing an overview of its status; and (2) an analysis of the costs and benefits: rate of return and graduate analysis, student costs and benefits, institutional costs and benefits, student employer costs and benefits, and a summary analysis. Some statistical data are included. (MSE)

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COOPERATIVE EDUCATION - A NATIONAL ASSESSMENT

Final Report, Volume I

Covers Period of Performance
During
July, 1975 - November, 1977

U.S. DEPARTMENT OF HEALTH
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1

INTRODUCTION AND OVERVIEW OF COOPERATIVE EDUCATION

I. SCOPE OF THE STUDY

The overall purpose of this study is to provide a comprehensive assessment of cooperative education (co-op) which will give insight into the effectiveness and desirability of this type of education as an education strategy. The focus has been on identifying, describing, and analyzing the advantages and disadvantages of co-op for each of the three central participants in the cooperative education system: students, educational institutions, and employers.

In response to the request for proposal, (RFP) 75-69, Applied Management Sciences, Inc. prepared a comprehensive and detailed proposal which was subsequently funded. Although entitled Cooperative Education - A National Assessment, this study does not encompass all cooperative education programs offered in the nation. In fact, the majority of cooperative education programs falls outside of the range of interest of this study. That is, most cooperative education programs are at secondary level institutions, and this study is limited to those programs offered at postsecondary institutions. Further delimiting this study is the condition that the institutions must be accredited by a United States Office of Education (USOE) recognized accrediting agency, and have degree-granting authority. Finally, this study focuses on IHEs [1/] which are receiving, which have received, or which are eligible to receive funding under Title IV-D of the Higher Education Act of 1965 (HEA), as amended. Therefore, the institutions considered of interest to this study are 2- or 4-year colleges, accredited and degree granting.

[1/] Institutions for Higher Education (IHE) is used as a synonym for 2- or 4-year colleges.

This study was structured around four major areas of investigation, and each is reported on in a separate chapter of this document. These areas include: (a) analysis of costs and benefits, (b) assessment of national potential for expansion, (c) for IV-D programs, assessment of the general effectiveness of the funding regulations and procedures, and (d) assessment of the role of cooperative education in career education.

A. Analysis of Costs and Benefits

Chapter 2 presents the results of analyses for estimating and comparing costs and benefits directly associated with cooperative education. The costs and benefits of cooperative education will be investigated primarily from the point of view of the student participant, but also from the educational institution and the employer. A major emphasis in this analysis will be to identify the actual personnel utilized as opposed to directly asking respondents dollar values of costs and benefits. Furthermore, many of the costs and benefits will be only of a qualitative nature to which dollar values cannot be attached.

B. Assessment of National Potential for Expansion

This phase of the study consisted of assessing the feasibility and potential for expansion of cooperative education programs. Chapter 3 presents the analyses of: (1) the potential for expansion at the present time and (2) the factors which may aid or hamper future expansion of cooperative education.

The potential for co-op expansion depends upon the individual motivations and benefits of the various co-op participants, including students, educational institutions, employers, and the government. The potential also depends on the resource constraints and costs of the participants.

Information on student motivation for entering or failure to enter co-op programs was obtained from questionnaires addressed to co-op and non-co-op students.

Relevant information also came from employers who were willing or unwilling to expand their programs, institutions willing or unable to expand, and faculty and/or staff of programs which failed to get enough students.

Discussed in this chapter are the analyses which explored the questions of whether the potential for expansion varies significantly across different areas of study (e.g., trade and industrial, health services, liberal arts, etc.), if this potential may also be a function of labor market conditions, and if certain types of co-op programs may be more viable than others.

C. Effectiveness of IV-D Funding Regulations and Procedures

Chapter 4 of this report explores what effects there have been that can be isolated as attributable to or associated with cooperative education funding under Title IV-D legislation. A major objective in this section of the analysis was to determine if Federal funds appear to be necessary for stimulating the development/expansion of cooperative education programs.

One major focus of this phase of the study was to address the extent to which the institutions' receipt of Title IV-D funds affected their decision to start or expand their cooperative education programs. A second major objective in the analysis of Federal effectiveness was to determine for what purposes the Title IV-D funds are actually being used.

The other major objectives in analyzing Federal effectiveness were to determine if Title IV-D funding of cooperative education is being offset by lessened expenditures in other Federal student aid programs, to determine if current administrative regulations inhibit or facilitate the growth of co-op, to explore differences between programs funded under Title IV-D and those cooperative education programs that do not receive Federal funds, to examine possible ways in which the Federal government could more effectively monitor and evaluate cooperative education programs and the attendant funding mechanisms, and to determine if programs in the study's sample funded under Title IV-D are actually addressing priority areas identified by USOE.

D. The Role of Cooperative Education in Career Education

Obviously, the working relationship between students, IHEs, and employers is career education. Questions concerning career education were asked to assess whether cooperative education is a viable career education experience. This is considered in Chapter 5 of this report in the light of disparity of opinions as to what is career education. The types and qualities of experiences to which co-op students are exposed, and the usefulness of these experiences in helping them to select and pursue careers, are analyzed using data from the college graduates included in this study.

In particular, we will determine if students have received counseling, job rotation, and aptitude testing. In addition, we will determine if any changes have occurred in curricular offerings or content, satisfaction, or continuing education as a result of cooperative education programs.

II. NATURE OF COOPERATIVE EDUCATION

Cooperative Education is still a relatively recent phenomenon. While its roots now go back over a half a century, the real growth in the cooperative education movement only took place within the past few years, with the early 1970s being the start of a dramatic upsurge in the extent of its growth. While early precursors of the cooperative form of education probably were tried many times before, the origin of cooperative education is traditionally credited to Dean Herman Schneider in September of 1906.

> As in the case of all important ideas, times and dates are affixed to prominent happenings which signal the attention of the observer on the developing concept. Cooperative Education is traditionally identified as having come to fruition first at the University of Cincinnati in 1906 when the Dean of Engineering, unable to find acceptance for the idea in an eastern university, found support in this highly industrial Ohio town. The program represents the traditional approach to cooperative education: engineering oriented with long-range commitments to industry on the part of the institution and the student employee. [1]

Fifteen years later, in 1921, Antioch brought its liberal arts college into this new educational concept, becoming the first non-engineering institution to offer co-op. In 1924, the first industry-sponsored program was started when a cooperative education program was established at the General Motors Institute. Growth over the next four decades was very slow and tradition-oriented. In 1962, there were still only about 50 institutions offering cooperative education, primarily 4-year schools, and largely confined to the areas of engineering and business. However, over the next decade a tremendous spurt in growth occurred, both in number of schools and in the expansion into new areas and non-traditional forms of cooperative education. By 1971 there were an estimated 250 schools offering co-op, and in 1973, after the Title IV-D program reached its fully-authorized funding level, 576 programs of cooperative education were operational or in the planning stage. Currently there are over 1,000 institutions of higher education with co-op programs.[1] With this rapid growth in the number of co-op programs also came an increase in the variety of institutions offering co-op, the areas in which it was offered, and in the forms of program structure. No longer is co-op almost exclusively confined to business and engineering programs in 4-year IHE with alternating schedules[2] of work and study. Growth in co-op at 2-year schools was such that they now constituted almost half of all co-op programs. Along with this, co-op has been increasingly offered in typically 2-year disciplines, such as trade and industry and many of the health professions, as well as greatly expanded in the liberal arts areas. Also, this growth has seen many more programs with parallel work and study or other non-traditional and/or innovative calendars.

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[1] Hunt, Donald C., Fifty Views of Cooperative Education, Detroit: Midwest Center for Cooperative Education, 1974, p. 4.

In fact, a major problem in designing this study was that it is virtually impossible to describe a "typical" cooperative education program.

When many educators hear the word co-op, they immediately envision an all-encompassing program similar to the ones in operation at Northeastern University and LaGuardia College. At these schools, the great majority of the students participate in a co-op program and literally thousands of students may be participating in co-op during any given semester. In these types of schools, permanent college staff members have as virtually their sole responsibility the recruiting of co-op employers and the placing of co-op students with those employers. Similarly, because so many students do participate in co-op, courses are sequenced and scheduled to accommodate the schedules of the co-op students; and the schools even support research organizations having missions that promote and improve cooperative education in the United States.

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[1] Brown, Sylvia J., and Wilson, James W. "Survey of Cooperative Education, 1976." Journal of Cooperative Education, November, 1976.

[2] The two basic forms of co-op schedules can be defined as follows:
(1) Alternating programs are those in which students alternate periods of full-time work with periods of full-time study.
(2) Parallel programs are ones in which students simultaneously engage in part-time work and study.

However, while these types of schools operate the best known co-op programs, they form a tiny minority. In fact, in the course of conducting this study and examining all of the available literature, the study staff was able to identify less than a dozen colleges and universities in which even 50 percent of the student bodies participate in co-op.

Far more common are co-op programs involving less than 10 percent of the student body. These programs typically are administered either by a single individual, often called the co-op coordinator; or else the programs are independently administered within academic schools or departments. This might result in the engineering school and the business school operating independent programs (sometimes placing students with the same employer); or in the distributive education department, the accounting department, and the secretarial studies department in a business school operating independent programs.

In either case, these smaller programs do not usually have employer recruiters, student placement specialists, or research operations. Rather they tend to be operating program heads who, on either a full-or part-time basis, run the program for the institution, the academic school, or the academic department. In these instances, this single individual recruits the employers and students, places the students, visits their worksettings, grades them, and often meets with them in a seminar setting. In addition, since particularly at the department level these persons do not spend full-time working with the co-op program, these same individuals often have teaching or other university responsibilities such as working in the placement office.

Because these programs involve such a small proportion of the student body, they tend to operate with a relatively low profile where, according to our study, they are viewed rather favorably by nonparticipants who do not tend to have a high level of awareness regarding their structure or offerings. The exception to the above is where the programs, while relatively small when compared to the total student enrollment, are concentrated in a single unit of the institution such as the engineering school. In these cases, especially where the programs are virtually compulsory, the programs tend to be structured closer to the Northeastern/LaGuardia model with recruiters and placement specialists, a high level of visability, etc.

Finally, there is a third type of co-op program which can be found. These programs differ from the second, most common variety in that they might not even have a student placement or employer recruiting function. These programs operate by granting academic credit for co-op to students who have found their own part-time jobs, often months or years before enrolling in co-op. These programs, perhaps better called non-programs, serve the needs of working students by providing them with academic credit for the time they would be spending at work anyway; and they serve the needs of institutions by providing them with revenue, either from tuition or ADA[1] formulas, for which they have to provide a minimum of services. It is impossible to say how prevalent this variety of co-op is because many fine co-op programs do accommodate students who locate their own work situations, and indeed, there is absolutely nothing wrong with this. However, it is when this type of placement becomes the rule rather than the exception that the line is crossed and the program runs the risk of becoming a "non-program."

While we identified very few of these types of programs, it is impossible to say how many of them are really in existence. The reason for this is that this study only included schools that permitted our teams to visit their campuses and speak with their students, employers, and faculty, and it is highly likely that programs of the last type would not permit their programs to be examined this closely.

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[1] Average Daily Attendance.

Three of the most significant variables, which define the dimensions along which co-op programs vary, were given a special attention in the design of this study and in the analysis of the data which were collected. The first of these variables is the level of the school, 2-year or 4-year, at which the co-op program is offered. The second was the discipline area in which the co-op program is offered. In this study, five of the most important program areas in which co-op is offered were included in the sample and incorporated into the analysis. These were: business, engineering/architecture, health professions, trade and industry, and liberal arts. Finally, because the assessment of the Federal role in cooperative education was of great importance, the third variable given a paramount role in the design and analysis was whether or not the institution had received funding in support of their co-op program, under the terms of the basic legislation for Federal support of Cooperative Education Programs, Title IV-D, Sections 451, 452, and 453 of the Education Amendments of 1968 (P.L. 90-575) and 1972 (P.L. 92-318) of the Higher Education Act of 1965 (P.L. 89-329).

For the 1975 fiscal year, $10,750,000 was authorized under this legislation. The appropriations are divided into two parts. The first and major part is for the administration of cooperative education programs at institutions of higher education. (The other part of appropriations will be discussed below.) The major portion, $10,000,000, is for grants "to institutions of higher education for the planning, establishment, expansion, or carrying out by such institutions of programs of cooperative education that alternate periods of full-time academic study with periods of full-time public or private employment that will not only afford students the opportunity to earn through employment funds required toward continuing and completing their education but will, so far as practicable, give them work experience related to their academic or occupational objective."[1]

The Federal support granted under the legislation is to provide for cooperative education. Based on HEW's interpretation of the Higher Education Act of 1965, as amended, cooperative education is defined as "that kind of career education that provides an opportunity for full-time students to alternate periods of academic study with periods of off-campus employment."[2] It is further intended that "periods should be of sufficient duration to provide meaningful classroom and off-campus experiences."[3]

As indicated in the discussion of appropriations authorized above, "cooperative education gives students an opportunity to earn funds that may be needed to support and complete their education."[4] It also, "gives them off-campus experiences that are closely integrated with and that enrich their total education and their academic and/or career goals."[5]

The specific wording of the Act seems to imply that the primary purpose of the appropriations is to provide students with funds for their education, i.e., financial aid, and only secondarily to provide relevant work experience. This is indicated, perhaps, by the fact that criteria for approval of applications were developed with the Advisory Council on Financial Aid to Students, as required by the legislation. In addition, Title IV of the Higher Education Act is entitled, "Student Assistance."

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[1] From HEA, Title IV-D, Section 451.

[2] HEW publication, "Instructions for Submitting a Cooperative Education Program Application," Academic year July 1, 1975-June 30, 1976, p.3.

[3] Loc. Cit.

[4] Loc. Cit.

[5] Ibid. p.4.

The reason for this discussion of the legislation and administrative provisions is simply to allow the distinction to be clearly made between IHE cooperative education programs as a whole and that subset of special concern - programs funded under the IV-D of the HEA. The majority of cooperative education programs funded under the provisions have not been in existence very long nor has the amount of Federal dollars been that great. Those institutions with co-op programs not receiving IV-D funds generally have had much greater involvement in both time and level of effort. Therefore, our focus is to examine the developmental patterns of the IV-D programs that have been at least partially successful in implementing an operational program in relation to those programs that have been instituted without Federal funding. Thus, a major purpose of this study is not only to provide information for policy and budget planning, but also to provide information upon which recommendations for the improvement of current program operations in the administration of Title IV-D could be based.

Therefore, this study can be readily divided into questions about co-op programs in general, and question about a subset of recently funded operational programs under the HEA. For co-op programs in toto, the following general questions were addressed. Is co-op:

- serving as a financial aid program to students by helping them support their college education?
- preparing students to enter and progress in their career choices?
- providing a return on their short-term time investments?
- establishing a closer relationship between student work and classroom experience?
- affecting the costs of the IHE's provision of services?
- affecting the processes of the IHE in the provision of services?
- affecting the quality or quantity of employer productivity?
- reaching a point of saturation preventing further expansion?

For IV-D programs:

To determine if:

- Federal funds are necessary for stimulating the development of co-op programs;
- IV-D funding changes the pattern of financial aid from various sources;
- processes differ in the IHE's receiving funds in relation to other co-op programs;
- mechanisms for improving current IV-D administrative provisions can be established; and
- minorities and women are receiving greater emphasis in the Federally funded programs.

Answers to these general questions were elicited by a series of questionnaires administered to selected groups of respondents at Institutions of Higher Education which receive IV-D funds, Institutions of Higher Education which have cooperative education programs but do not receive Federal funds, and Institutions of Higher Education which do not have cooperative education programs. Complete details on how the sample was selected, and the respondents that were interviewed, are provided in the Replication Handbook, one of the documents produced in the course of this study. These products include:

Cohen, Arthur M.; Solomon, Lewis, Cooperative Education - A National Assessment: An Annotated Bibliography. Applied Management Sciences, 1976.

Kettner, George A; Deane, Robert T.; Cohen, Alan J.; Frankel, Steven, Cooperative Education - A National Assessment: Data Analysis Plan. Applied Management Sciences, 1976.

Novalis, Peter; Cohen, Alan; Frankel, Steven, Report on Federal Funding Patterns for Cooperative Education Under Title IV-D of the Higher Education Act. Applied Management Sciences, 1976.

Hulse, Billie; Cohen, Alan; Frankel, Steven, Data Collection Report. Applied Management Sciences, 1976.

Hulse, Billie; Cohen, Alan; Frankel, Steven, Replication Handbook. Applied Management Sciences, 1977.

Frankel, Steven; Cohen, Alan; Dean, Robert; Smith, Larry, Cooperative Education - A National Assessment; Final Report. Applied Management Sciences, 1977.

III. OVERVIEW OF THE STATUS OF COOPERATIVE EDUCATION

The remaining chapters of this report will provide detailed analyses of cooperative education in terms of the four major study areas to be addressed by this study. However it will be informative for this introductory chapter to present an overview of the status of cooperative education in terms of the fulfillment of its major objectives, based on the data collected by this project.

The legislative mandate underlying the Federal involvement in and support for cooperative education specifically includes two major objectives:

- Co-op should serve as a financial aid program for students by helping them to support their college education.
- Co-op should establish closer relationships between work and classroom experiences. [1]

In addition, two additional objectives are included in the instructions of the institutional application for a Title IV-D grant. These are that:

- Co-op should promote better career choices by students.
- Co-op should provide sound, economical sources of skilled manpower for employers. [2]

Thus, one issue that must be explored before looking at any specific impacts of cooperative education or the efforts of the support provided by the Title IV-D program is the determination of the extent to which cooperative education programs, in general, are meeting such objectives. For any form of government intervention to be justified, it should be the case that the participants--schools, students, and employers--are receiving at least some of the intended, or potential, benefits implied by these objectives. While the other chapters of this report will provide much more detailed examination of specific types of cooperative education benefits, the remaining sections of this chapter will provide a general picture of how cooperative education programs are working and how they are viewed by their participants in relation to these four objectives.

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[1] Sec. 451 (a), Title IV, Part D of the Higher Education Act of 1965 (P.L. 89-329), as amended by P.L. 90-575 and P.L. 92-318.

[2] HEW publication, "Instructions for Submitting a Cooperative Education Program Application," Academic Year July 1, 1975 - June 30, 1976, pp. 3-4.

A. Serve as a Financial Aid Program for Students

The financial aid aspect of cooperative education has been given high priority by the Federal government. This is attested to by the fact that the Title IV-D program is authorized under Title IV, which is the Student Assistance Section of the Higher Education Act.

Among students there were a number of characteristics which differentiated among those who attached different degrees of importance to the various purposes of co-op. In relationship to the financial aid objective of cooperative education being examined in this section, Table 1.1 following displays how students of different backgrounds rated this purpose in terms of its importance to themselves.

TABLE 1.1: IMPORTANCE OF FINANCIAL SUPPORT AS PURPOSE OF CO-OP BY STUDENT TYPES

		% Rating Provision of Financial Support as Very Important	
Sex:	Male	53%	$p<.01$
	Female	49%	
Ethnicity:	Minority	60%	$p<.01$
	Non-minority	50%	
Program Area:	Business	49%	$p<.01$
	Engineering	64%	
	Health	42%	
	Trade - Industrial	49%	
	Liberal Arts	45%	
Parental Income:	Under $5,500	58%	$p<.01$
	$5,500 - $9,999	57%	
	$10,000 - $19,999	52%	
	$20,000 and over	41%	
Level of school attended:	4-Year	59%	$p<.01$
	2-Year	45%	
Funding Status:	IV-D	54%	$p<.01$
	Non-IV-D	47%	
Type of Control:	Public	49%	$p<.01$
	Private	66%	

As can be seen in this table, the financial support purpose of co-op is significantly more important among males, minority students, engineering students, students from lower parental income backgrounds, students attending 4-year schools, students at IHEs receiving IV-D funds, and students at privately controlled institutions. Of course, many of these characteristics are strongly interrelated--engineering students are primarily males, and minority students more often come from lower parental income backgrounds than non-minority students. In fact, it is the higher importance given to financial support by engineering students that accounts for the apparent difference between males and females. The higher importance of this aspect of co-op for engineering students is partly related to the fact that a higher proportion of engineering programs than any of the other program areas is in privately controlled schools, which are much more expensive to attend. Both ethnicity and parental income have separate effects on this rating, although parental income has the stronger impact.

From the standpoint of the actual student experience, it appears that the purpose of co-op serving as a financial aid mechanism is of especially great significance for certain categories of students. While co-op students are less likely to state that they entered the co-op program for its income benefits than for acquiring relevant skills or to make their educational experience more rewarding, there are a number of significant differences between students with different characteristics in terms of the importance of the various reasons for having entered the co-op program. (See Table 1.2 for full details of student reasons for entering co-op programs.) In particular, as was the case with the rating of co-op purposes, financial motivation for joining co-op are significantly more common among males, minority students, engineering students, and students from lower income backgrounds. However, it also should be pointed out that within every one of the subgroups of students included in the table, the acquisition of career skills is rated as a very important reason by a larger proportion of students than are any of the other reasons for joining co-op. In terms of their actual profiles of financial support while in school,

TABLE 1.2: STUDENT'S REASONS FOR ENTERING COOPERATIVE EDUCATION PROGRAMS BY STUDENT CHARACTERISTICS

% of Students Rating Reason as Very Important For:

	All Students	Males	Females	Minority	Non-Minority	Business	Engineering	Health	Trade & Indust.	Liberal Arts	Parents' Income: Less Than $5,500	$5,500 -9,999	$10,000 -19,999	$20,000 or over
To acquire skills and experience related to my career objectives	77% (1146)	75% (715)	83% (431)*	81% (241)	77% (892)^{NS}	80% (445)	79% (302)	80% (48)	60% (64)	77% (244)*	80% (161)	76% (211)	78% (455)	77% (216)^{NS}
Felt it would make it easier for me to get employment after graduation	67% (884)	62% (591)	73% (372)*	72% (211)	64% (747)*	66% (370)	72% (275)	72% (43)	56% (59)	61% (188)*	69% (139)	64% (177)	67% (412)	66% ([illegible])^{NS}
To make my educational experience more rewarding	65% (960)	61% (587)	71% (372)*	74% (225)	62% (722)*	65% (364)	65% (249)	73% (43)	44% (46)	70% (225)*	72% (148)	65% (181)	62% ([illegible])	[illegible]*
To prepare me for a changing job market	54 % (793)	50% (481)	61% (312)*	64% (188)	52% (595)*	60% (334)	53% (200)	46% (27)	44% (46)	52% (162)*	60% (121)	55% (160)	53% (328)	54% (143)^{NS}
Additional income was absolutely necessary to continue education	34% (495)	36% (347)	29% (148)*	43% (129)	31% (362)*	29% (161)	44% (168)	23% (13)	31% (32)	32 % (101)*	41% (83)	39% (109)	33 % (204)	22% ([illegible])*
Recommended by persons I respected	31% (457)	30% (283)	34% (174)^{NS}	34% (100)	31% (353)^{NS}	31% (174)	31% (117)	40% (22)	29% (30)	30% (94)^{NC}	36% (72)	31% (84)	30% (186)	31% (54)^{NS}
Wanted additional income although it was not absolutley necessary	20% (284)	18% (168)	23% (118)^{NS}	24% (69)	19% (211)^{NS}	23% (124)	16% (59)	27% (15)	21% (22)	17% (50)*	26% (52)	20% (55)	18% (108)	13% (30)^{NS}

* = p. < .05
NS = Not statistically significant

1.17

students in cooperative education programs appear to be somewhat less reliant on other forms of student aid, and they do receive significantly less support from their parents (33% on the average) while in school than do non-co-op students (an average of 39%). A much more detailed analysis of co-op's influence on students' sources of financial support will be provided in Chapter 2 of this report, Section II, Student Costs and Benefits.

While most students indicate that without co-op much of the needed income would be made up from the earnings from other jobs, as opposed to student loans or other forms of student financial aid (see Table 1.3), the need for increased financial aid would be significantly greater for certain subgroups of students. These students, who are much less likely to be able to turn to parents or savings to make up the lost support from co-op, are, to a great extent, the same set who, as was shown earlier, entered the co-op program at least in part for financial reasons.

Thus, the data indicate that co-op can and does provide significant amounts of financial support for students than is actually needed for college attendance, and not simply supplementary 'extra monies' (as seen in the preceding table, only 6 percent of the co-op students indicated that the money received from co-op would not have to be made up from some other source in order for it to be possible for them to attend college.) Additionally, it is for certain significant groups of students, especially minorities, that this financial support component of cooperative education is most important. While even for these groups, the educational components of co-op are often rated as very important, they do have greater need for financial support and are more likely to be in co-op programs at least in part for these reasons. And minority students are, in fact, significantly more likely to feel they would have to turn to student financial aid than non-minority co-op students if they were not receiving earnings from their co-op jobs. Thus, it appears that the role of co-op as a financial aid mechanism, and the explicitly stated Federal goal of using co-op for making social

TABLE 1.3: POTENTIAL SOURCES OF INCOME THAT COULD REPLACE CO-OP EARNINGS BY STUDENT TYPE

% Indicating Alternative Source Would be Used: [1/]

	All Students	Minority	Non-Minority	Male	Female	Business	Engineering	Health	Trade & Indust.	Liberal Arts	Parents' Income: Less Than $5,500	$5,500 -9,999	$10,000 -19,999	$20,000 and over
Earnings from non-co-op jobs	37% (584)	35% (110)	38% (468)^{NS}	41% (410)	31% (173)**	33% (193)	44% (179)	24% (16)	34% (38)	39% (130)**	34% (72)	42% (124)	37% (241)	39% (114)^{NS}
Parental support	27% (415)	19% (60)	29% (350)*	24% (236)	32% (179)**	26% (155)	31% (123)	28% (19)	17% (19)	22% (75)*	17% (36)	18% (53)	28% (186)	44% (128)**
Savings	20% (305)	14% (45)	21% (256)**	19% (170)	21% (304)^{NS}	19% (113)	20% (79)	21% (14)	19% (21)	19% (65)^{NS}	14% (29)	14% (41)	22% (142)	23% (68)**
Other student financial aid	14% (220)	24% (75)	11% (140)**	14% (142)	14% (78)^{NS}	13% (77)	17% (67)	9% (6)	8% (9)	15% (51)^{NS}	25% (54)	21% (61)	12% (80)	4% (12)*
Student loans	14% (222)	17% (54)	14% (165)^{NS}	16% (164)	10% (57)**	11% (63)	24% (96)	9% (6)	5% (6)	12% (49)**	13% (27)	19% (55)	16% (103)	10% (29)**
Would not attend college without co-op earnings	6% (98)	9% (29)	6% (69)*	7% (72)	5% (26)^{NS}	6% (35)	6% (24)	6% (4)	4% (5)	8% (26)^{NS}	10% (21)	7% (20)	6% (38)	3% (10)*
No replacement of income would be necessary	6% (95)	4% (13)	7% (81)^{NS}	6% (60)	6% (35)^{NS}	8% (45)	2% (8)	9% (6)	8% (9)	7% (24)**	4% (12)	6% (37)	6% (37)	7% (21)^{NS}

** = p .01
 * = p .05
NS = Not statistically significant

[1/] Percentages total more than 100% since students could indicate more than one alternative source.

impacts to the specific benefit of minorities and other disadvantaged groups, is intertwined.

However, at the institutional level, the use of co-op as a financial aid mechanism appears to be less important than other such mechanisms. The senior academic officials were asked to rate the significance of seven categories of financial aid in terms of their impact in helping the institution accept qualified but financially needy students (see Table 1.4). In addition to co-op earnings, these forms of financial aid included: Federal scholarships or grants, State scholarships or grants, guaranteed student loans, work-study earnings, and earnings from other employment. Earnings from co-op jobs were rated least often as having a significant impact, by 36 percent of these respondents as compared to one-half or more for all other categories, except state scholarships (44%). Of course, the much smaller size of co-op than most of these other programs, both in terms of funding level and number of students served, would account for this lesser impact at an institution-wide level. Also, State scholarships and guaranteed student loans were rated more often than co-op programs as having little or no impact in helping the institution to accept financially needy students

TABLE 1.4: IMPACT OF FORMS OF STUDENT SUPPORT IN ADMITTING NEEDY STUDENTS

	% of Senior Academic Official's Ratings as:		
	Significant Impact	Some Impact	Little or No Impact
Federal scholarship or grant	79.4%(50)	15.9%(10)	4.8% (3)
State scholarship or grant	43.5%(27)	35.5%(22)	21.0% (13)
Guaranteed student loan	50.0%(30)	33.3%(20)	16.7% (10)
Earnings from co-op employment	36.5%(23)	55.6%(35)	7.9% (5)
Earnings from work-study employment	61.3%(38)	38.7%(24)	0
Earnings from other employment	53.2%(33)	45.2%(28)	1.6% (1)

(21.0% and 16.7% versus 7.9%). This same reason, the difference in scope of program at the institutional level, no doubt also influenced the responses when the senior academic officials of the schools surveyed were asked to directly compare the effectiveness of co-op with work-study along three dimensions. While all (100%), agreed co-op was more effective as a means of career development, the majority felt work-study was more effective both as a source of financial aid to students, i.e., by 64 percent, and as a means of supporting the institutions' services (76%). (See Table 1.5 below.) This very high rating for work-study's role in supporting institutional services is due not only to the larger number of students involved, but also because many of the work-study students are typically employed by the institution itself, with the Federal government subsidizing 80 percent of their wages. Also, it is clear that the greater number of students involved in work-study has greatly influenced the relative effectiveness rating of these two programs as financial aid for students, since for the individual student, co-op usually can generate more money.

TABLE 1.5: EFFECTIVENESS OF WORK-STUDY PROGRAMS COMPARED TO COOPERATIVE EDUCATION PROGRAMS

% of Senior Academic Official's Opinions

	Co-op is more effective	Work-study is more effective
As a source of financial aid to students	36% (20)	64% (36)
As a means of career development	100% (59)	0
As a means of supporting your institution's services	24% (13)	76% (41)

While some of the evidence presented indicates that at the institutional level co-op is not serving as an effective student aid mechanism in the way that scholarship programs, student loan programs, and the College Work-Study Program have provided such aid, it would seem that this is largely due to the fact that co-op generally involves only a small proportion of the students at the institution. The average co-op program contains only about 10% of the total school enrollment. Thus, it would seem reasonable to hypothesize that as the proportion of the school's enrollment that is in co-op increases, the effectiveness of co-op as a financial aid mechanism would also increase. To test this hypothesis, the correlation between proportion of school enrollment in co-op and the average amount of financial aid per student used by the school was computed. Overall, this hypothesized relationship did not appear. However, it was noted that public and private schools differed vastly in their use of financial aid monies. Private schools used nearly three times the amount of financial aid per student on the average than did publicly-controlled institutions ($980 vs. $329). Because of this discrepancy, it was decided to examine the hypothesized relationship separately for public and private IHEs. For the private schools, using large amounts of financial aid money, the per student use did increase significantly as the proportion of students in co-op increased. The calculation coefficient was -.493 which is statistically significant at the 99 percent confidence level; for public schools, virtually no correlation was found (r = .027). Thus, it appears that co-op could, at least for those types of schools such as the privately-controlled that use large amounts of financial aid per student, serve as a viable and effective financial aid mechanism for the institution as a whole as well as for the individual student.

While co-op is clearly serving as a viable and valuable source of financial aid at the student level, and shows the potential for being an effective financial aid mechanism at the institutional level, it should also be noted that other features of cooperative education are also considered significant from the point of view of the participants.

One example of this comes in the following responses made by three categories of IHE personnel. These three respondent groups are comprised of: a) senior academic officials, b) cooperative education directors, and c) cooperative education faculty members. These institutional participants rated eight potential objectives of this program in terms of their importance as a reason for the school's administrative support of a cooperative education program. While cooperative education as a financial aid mechanism was also important, it was significantly and consistently, a less central consideration as compared to several of the educational objectives of cooperative education. Table 1.6 shows the percentages in each of these three respondent groups who rated each of the reasons as "very important." Cooperative education as a financial aid tool is rated as "very important" half as often (or even less frequently) than is cooperative education as a means of integrating academic and career development. In general, this pattern was consistent not only for the three types of respondents, but also for respondents from different types of institutions (i.e., 2-year vs. 4-year, public vs. private, IV-D funded or not). Among the few statistically significant differences of this type was that senior academic officials at 2-year institutions attached greater importance to keeping

TABLE 1.6: REASONS FOR ADMINISTRATIVE SUPPORT OF CO-OP
(% Rating Reasons as "Very Important")

	Senior Academic Officials	Co-op Directors	Faculty
Integrating academic and career development	97	86	90
Enhancing student motivation	89	81	88
Expanding job placement	76	59	61
Keeping curriculum up-to-date	67	58	76
Student financial aid	44	27	46
Expanding enrollment	23	30	32
Funding for institution	16	20	34
Decreasing class space/function	6	3	6

the curriculum up-to-date than did the senior academic officials at 4-year IHEs. On the other hand, co-op directors at 4-year schools felt the financial aid component was more important than did co-op directors at 2-year institutions. Among faculty members, the reasons of expanding enrollment, supplementing student financial aid, obtaining outside funding and expanding job placement activities were rated as more important by those from schools receiving IV-D funds than by faculty at non-IV-D institutions.

In the same vein, the senior academic officials, the cooperative education directors, the faculty members interviewed, and both co-op and non-co-op students were all asked to rate their opinion of the importance of several possible purposes of co-op programs. Again, a consistent pattern across all respondent groups emerged. As in the previous case, this pattern indicated a relatively lower degree of importance given to co-op as a financial aid mechanism. While about half of the students felt that financial aid was a very important purpose of co-op, almost four-fifths rated career awareness and specific occupational preparation as very important (see Table 1.7 for the complete set of ratings of all purposes for all the respondent groups).

Again at the institutional level, there were few differences in the pattern of responses among senior academic officials, co-op directors, and faculty from different types of schools. A statistically significant greater proportion of the senior academic officials from 2-year schools rated providing employers with better sources of manpower as very important than did those from 4-year schools. Faculty at 2-year non-IV-D IHEs felt the student financial aid aspect was less important than did faculty at the other three types of schools. Also, faculty from public institutions more often rated providing the institution with a better public image as very important than did faculty at private IHEs. In terms of all of the other potential purposes of cooperative education, there were no statistically significant or consistent pattern of differences among respondents from different types of schools within each of the three categories of institutional respondents.

TABLE 1.7: PURPOSES OF CO-OP
(% Rating Purpose as "Very Important")

	Senior Academic Officials	Co-op Directors	Co-op Faculty	Non-Co-op Faculty	Co-op Students	Non-Co-op Students*
Career awareness	88	89	88	86	78	66
Special occupational preparation	86	97	87	84	78	67
Manpower for employers	55	59	61	49	54	46
Student financial support	42	39	42	48	51	50
Student social development	41	65	53	43	55	46
Institution's public image	33	45	40	28	36	33
Institution's use of resources	12	17	28	20	33	34

*Those students currently not enrolled in co-op, but have indicated that they are considering participation.

B. Establish Closer Relationships Between Work and Classroom Experiences

As we have seen in the previous section, this objective for cooperative education is considered to be of great impact and has been given significant emphasis by the participants in the cooperative education process that we have studied. In this section we will look at some of the evidence as to how successful co-op programs in general have been in achieving this objective. In this regard we will focus most heavily on the responses and attitudes expressed by the students themselves, although, where relevant, we will bring in data collected from some of the other participants who play a role in this component of cooperative education.

When asked if the substantial proportion of their work experience during college has been related to their major area, a significantly higher percentage (76%) of the students enrolled in co-op programs stated that this was the case than among non-co-op students (41%) (see Table 1.8 below).

TABLE 1.8: WORK EXPERIENCE RELATED TO MAJOR AREA OF STUDY

	Co-op Students	Non Co-op Students
Jobs Directly Related	76% (959)	41% (659)
Not Directly Related	24% (308)	59% (946)
p .01	100%	100%

This difference between co-op and non-co-op was also consistently found in each of the five programs under study (business, engineering, health, trade and industrial, and liberal arts). This finding was also true for both male and female students as well as for both minority and non-minority students and for students from different parental income backgrounds. Co-op students also stated significantly more often that a very important advantage of working while in college is that it provides an opportunity to apply the subjects studied to actual work situations. When asked to rate various components of their co-op programs, 52 percent of the co-op students felt the relevance of classwork to work experience was an aspect of their program that rated better than average or excellent (see Table 1.9 below). While clearly this is a relatively favorable view, it was not one of the most highly rated components, thus implying that there is still much room for improvement in this regard. The rating given to the relevance of classwork to work experience was not different for minority students as compared to non-minority students or by parental income category. To some

TABLE 1.9: RATINGS OF CO-OP PROGRAMS

% of Students Rating Co-op Program as:

	Excellent		Average		Poor
	1	2	3	4	5
Adequacy of employers' facilities	35%(408)	33%(396)	25%(29)	5%(56)	2%(27)
Quality of instruction or training from co-op employers	33%(385)	33%(396)	25%(291)	5%(65)	4%(46)
Quality of instruction at college	25%(298)	40%(479)	27%(325)	6%(70)	1%(17)
On-going communication with employers	24%(281)	36%(420)	29%(337)	8%(100)	3%(38)
Relevance of class work to work experience	23%(264)	29%(348)	32%(348)	11%(130)	5%(63)
Placement of students in work experience	18%(213)	35%(213)	33%(381)	9%(108)	5%(57)
Recruitment of employers in career relevant areas	15%(180)	32%(365)	39%(453)	10%(113)	4%(48)
Placement of students upon graduation	15%(166)	29%(315)	42%(470)	9%(97)	5%(59)
Counseling in career planning	14%(162)	25%(292)	39%(464)	14%(165)	8%(99)
Overall quality of co-op program	30%(355)	40%(483)	23%(270)	4%(48)	3%(31)

extent, females, and in particular students in the health professions rated this area higher than others, while engineering students rated it lower (see Table 1.10 below).

TABLE 1.10: RATING OF RELEVANCE OF CLASSWORK TO WORK EXPERIENCE BY PROGRAM AREA AND SEX

% Rating Area as Excellent:

Business		Engineering		Health		Trade and Industrial		Liberal Arts	
Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
23%	28%	14%	7%	0	41%	21%	29%	14%	28%
(59)	(70)	(45)	(2)		(20)	(17)	(2)	(42)	(34)

p <.01 for overall male-female comparison and overall program area comparison

This linkage between class work and work experience can also be viewed from the perspective of the employers who hire the co-op students. These employers were also asked to rate several components of the co-op programs with which they were associated, including this same dimension of the relevance of class work to the work experience. Again, while the reaction is generally favorable (56% rate this above average or excellent) it does receive a lower rating than most of the other program components about which the employers were queried (see Table 1.11 below).

TABLE 1.11: EMPLOYER RATINGS OF CO-OP PROGRAM

% of Employer's Ratings As:

	Excellent 5	4	Average 3	2	Poor 1
Enthusiasm of students	50.9%(119)	37.2%(87)	11.5%(27)	0.4%(1)	0
Job skills improvement of students by end of work stay	39.5%(92)	51.1%(119)	9.0%(21)	0.4%(1)	0
On-going communication between school and firm	39.1%(91)	34.8%(81)	19.3%(45)	3.9%(9)	3.0%(7)
Cooperation of unions	27.9%(12)	16.3%(7)	41.9%(18)	4.7%(2)	9.3%(4)
Relevance of classwork to work experience	22.4%(52)	33.6%(78)	35.8%(83)	6.0%(14)	2.2%(5)
Overall quality of program	48.3%(112)	38.4%(89)	10.3%(24)	2.2%(5)	1.9%(2)

Also, among a series of potential advantages for co-op employers, the one most frequently cited as very important (by 67%) was that it improved communications with schools and made them more responsive to the needs of business, indicating the importance of this linkage in both directions (see Table 1.12 below). A much more detailed analysis of co-op from the employer perspective is presented in Section IV of Chapter 2 of this report, Analysis of Employer Costs and Benefits.

TABLE 1.12: ADVANTAGES OF COOPERATIVE EDUCATION

	% of Employer's Ratings As:		
	Very Important	Somewhat Important	Not Important
Improves communications with schools, makes them more responsive to needs of business	66.8%(153)	26.2%(60)	7.0%(16)
Provides a valuable community services	62.1%(144)	31.9%(74)	6.0%(14)
Finding potential permanent employees	57.2%(131)	30.1%(69)	12.7%(29)
Is good for public relations, enhances visibility of firm	53.2%(123)	31.6%(73)	15.2%(35)
They supplement the work of regular employees well	40.9%(92)	38.2%(86)	20.9%(47)
They keep the company in touch with new concepts and techniques being taught in school	39.1%(90)	37.0%(85)	23.9%(55)
They increase our knowledge of the skills and training requirements of recent college graduates in general	27.6%(64)	47.8%(111)	24.6%(57)
Increases motivation and productiveness of regular employees	26.3%(60)	28.1%(64)	45.6%(104)
They do the sort of work for which we cannot as easily afford to have regular employees do	23.5%(53)	14.6%(33)	61.9%(140)
Recruiting and hiring costs of co-op employees are relatively less	18.8%(42)	33.6%(75)	47.5%(106)
Lower recruiting costs	16.5%(36)	34.4%(75)	49.1%(107)
Wage costs (including fringe benefits) of co-op employees are relatively less	11.2%(25)	29.6%(66)	59.2%(132)

The attempt to link the classroom experience to actual work experience that has been made by cooperative education programs, in general, has also impacted strongly on the faculty members participating in co-op. Over 88 percent of the co-op faculty members surveyed felt that cooperative education had increased their own awareness and understanding of the skills required for occupations related to their program area, and 48 percent said it had done so considerably (see Table 1.13 below). This opinion was not related to the type of school or the program area in which the faculty members were working.

TABLE 1.13: EFFECT OF CO-OP ON INCREASING AWARENESS OF SKILLS REQUIRED FOR OCCUPATIONS

% of Co-op Faculty Members Rating Increase as:	
Considerable	48.0%(106)
Some	40.3%(89)
Little or none	11.8%(26)

While over half of the co-op faculty members indicated that co-op has caused changes in the curriculum, however, in most cases, these appear to be changes in course sequencing and scheduling or the addition of special career development courses; and they only infrequently listed specific changes aimed at making the course more relevant to the students' work experience.

Thus overall it would appear that co-op has made significant inroads into developing a close link between work and classroom experiences and that the participants in co-op programs, including faculty and employers as well as students, have benefited from this closer relationship between school and work. Nonetheless it does appear that improvements could be made in this area, especially in light of the fact that this area was uniformly rated by all participants as one of the most important features of co-op. Also, as was seen in Table 1.9, counseling in career planning was the lowest rated component of the co-op programs. This reiterates what is seen elsewhere in this report--that those components of co-op related to its role as a viable career education mechanism, which are under the control of the school, generally appear to be the weakest part of the process.

C. Promote Better Career Choices by Students

As we have seen in the earlier sections, this objective for cooperative education is given a very high priority by all of the participants involved. While in general it does appear that co-op students have fared better than non-co-op students in terms of receiving educational and work experiences that can provide for better career development, it is also an area in which there is much evidence that there is a great deal of room for significant improvement. It is in this area that specific programmatic features, within the school's domain, that, while presently weak, could make significant impact on the achievement of this objective. This would imply that it is also an area in which Federal policies in support of cooperative education could most easily be altered or refined in ways which could significantly aid in the fulfillment of this objective.

While there is much room for improvement, as has been mentioned previously, and as we will discuss below, there is some evidence that co-op students, especially in the work experience component of their program, have been given somewhat greater assistance in the development of sound career choices relative to non-co-op students. While more detailed analysis of this aspect of co-op will be found in Chapter 5 of this report (The Role of Cooperative Education in Career Education), we will present here a brief picture of how this objective is being met overall. More of the co-op students (47% as compared to only 33% of the non-co-op students) state that one of the very important advantages to the jobs held during college is that they give one the opportunity to determine one's own preferences (see Table 1.14 below). In terms of their specific current or most recent job, the co-op students are more likely to have had the opportunity to work at many different assignments. This is corroborated by the employers of co-op students, as seen in Table 1.15 below. While in most ways the training of co-op and non-co-op workers is quite similar, the employers do indicate that the co-op employees are more often provided with the opportunity to rotate among different job duties, receive closer supervision, and

TABLE 1.14 ADVANTAGES OF HOLDING JOB WHILE IN COLLEGE

	Co-op Students	Non-Co-op Students
Gives me a chance to try various jobs to determine my own preference	47%(586)	33%(501)**
Provides an opportunity to apply the things I study to actual work situations	65%(815)	48%(721)**
Permits me to make money to pay for college expenses	65%(808)	69%(1044)*
Give me a chance to assume real responsibility	62%(760)	51%(762)**
Increases my chances of getting a good job when my education is finished	74%(926)	60%(897)**

* $P < .05$
** $P < .01$

TABLE 1.15: TRAINING PROVISIONS FOR REGULAR EMPLOYEES AND CO-OP STUDENTS

(% of Employers Providing Training Activities)

	Regular Employees	Co-op Students
Orientation classes	72.2%(169)	66.6%(156)
Rotation of job duties	55.1%(129)	67.5%(158)
Training sessions headed by an instructor	64.9%(152)	61.9%(145)
Training aids and equipment	66.6%(156)	66.6%(156)
Close employee supervision	70.1%(164)	88.0%(206)
Learning by doing	85.9%(201)	94.4%(221)

to learn by doing. Each of these, and especially the job rotation component, would help make the work experience a better opportunity to fully learn about the type of work and thus enable the student to make a more sound career choice.

Thus, at least to some extent, it appears that co-op students have been provided opportunities and assistance in activities designed to aid in the development of sound career choices. They are also more likely to have been able to reach a decision based on these experiences. As seen in Table 1.16 below, almost four-fifths of the co-op students, as compared to just over half of the non-co-op students, expect to work after graduation in the same occupation as they have now. This difference between co-op and non-co-op remains true for both minority and non-minority students, for both males and females, for all parental income groups, and for students in each of the five program areas.

TABLE 1.16: ANTICIPATION OF CONTINUING TO WORK IN SAME OCCUPATION AFTER GRADUATION

	Co-op Students	Non Co-op Students
Same Occupation	79% (975)	56% (858)
Different Occupation	21% (259)	44% (678)
$P < .01$		

In terms of the in-school component, the indications are that this area is in need of considerable development. While most co-op programs provide career counseling (83%), and while most of the faculty involved in the co-op programs (72%) are also involved in providing career counseling to the students, the program components related to enhancing the student's ability to make sound career choices are generally among the lowest rated. While the counseling in career planning provided by the institution is more highly rated by co-op than non co-op students, it is not one of the most highly rated areas. In fact, when the co-op students were asked to rate this area specifically in reference to the co-op program, it was the lowest rated among the 10 categories given (see Table 1.9 from the preceding section).

Another indication of the relative weakness in this area is seen in the following Table (1.17) showing the ratings given to selected institutional features by students and faculty both co-op and non-co-op. Both abilities testing and counseling in choosing a major are consistently among the lowest ranked areas. Also the ratings by the corresponding co-op and non-co-op respondents are not substantially different, as they are in the case of the two more job related components--skills improvement and placement. This low rating is consistent for students in all program areas, for both males and females, minority and non-minority students, and from parental income backgrounds.

TABLE 1.17: RATING OF IHE BY STUDENTS AND FACULTY

(% Rating Area as Above Average or Excellent)

	Co-op Faculty	Non-Co-op Faculty	Co-op Students	Non-Co-op Students
Enthusiasm of students	58%	48	30	26
Enthusiasm of teachers	68	68	46	46
Job skills improvement of students by end of program	76	65	55	38
Testing to ascertain abilities and interest	31	26	27	26
Counseling in choosing a major	40	35	31	30
Placement of students after graduation	59	47	41	26
Quality of instruction at college	80	80	64	58

All of these findings taken together seem to imply that co-op has done fairly well in the job experience components of career development, but that in the areas of school-sponsored support activities, which could better promote the development of sound career choices, much more could be done.

The ultimate indication of success in this objective is, of course, based on the actual career choices made by the students after graduation from college. From the data we have collected from graduates, it again appears that while co-op graduates appear to have fared somewhat better than their non-co-op counterparts, much room for enhancement of this component of a cooperative education program still exists.

For example, while a sizeable proportion of the co-op graduates (40%) indicate that their participation in cooperative education helped them find a career to their liking, this means that this was not the case for the majority. As measured by their satisfaction with their current job, the graduates of co-op programs have slightly greater satisfaction than do non-co-op graduates. While the differences are statistically significant, nevertheless, as can be seen in Table 1.18 following, the actual difference is quite small.

TABLE 1.18: SATISFACTION WITH CURRENT JOB

	Co-op Grads	Non Co-op Grads
Highly satisfied	52%(434)	48%(898)
Somewhat satisfied	37%(305)	37%(686)
Somewhat or highly dissatisfied	11%(91)	15%(285)
	100%	100%
P < .01		

Similarly there is a statistically significant, but again relatively small difference between co-op and non-co-op graduates in terms of how related they feel their current job is to their career plans (see Table 1.19 below).

TABLE 1.19: RELATEDNESS OF CURRENT JOB TO CAREER PLANS

	Co-op Grads	Non-Co-op Grads
Directly related	63%(510)	56%(1038)
Somewhat related	30%(243)	30%(557)
Not related	7%(61)	14%(253)
P < .01		

Thus, in summary, it appears that the objectives of promoting better career choices among students is one in which co-op has been somewhat successful, but where more attention is needed. As noted previously, additional analyses of this component of co-op is provided in Chapter 5 of this report, Assessment of the Role of Cooperative Education in Career Education.

D. Provide Sound, Economical Sources of Skilled Manpower for Employers

As both a sound and an economical source of skilled manpower, co-op programs in general appear to be quite successful. While the Employer Cost and Benefits section of Chapter 2 will provide a more thorough analysis of employer involvement in co-op, this section will give a brief overall picture of how co-op is meeting this objective. As seen in Table 1.20 below, most employers feel that co-op students are usually no more costly, and often less costly, than are regular employees doing the same work. In fact savings are quite frequent in the areas of recruitment, wages, and fringe benefits.

TABLE 1.20: COMPARISON OF COSTS OF CO-OP STUDENTS VERSUS REGULAR EMPLOYEES

	% Of Employers Indicating Co-op Costs:		
	More	Less	No difference
a. Finding potential job applicants	6.5%(14)	47.0%(101)	46.5%(100)
b. Interviewing job applicants	4.7%(10)	34.4%(74)	60.9%(131)
c. Processing newly-hired employees	4.7%(10)	23.6%(51)	71.8%(155)
d. Training and orientation	23.6%(51)	31.0%(67)	45.4%(98)
e. Scheduling work times, work loads	30.0%(65)	14.3%(31)	55.8%(121)
f. Use of materials	3.3%(7)	13.3%(28)	83.4%(176)
g. Absenteeism, tardiness	6.4%(14)	36.1%(74)	57.5%(125)
h. Record keeping, evaluation of performance	34.3%(74)	13.0%(28)	52.8%(114)
i. Supervision	35.2%(76)	22.2%(48)	42.6%(92)
j. Wages, Salary (excluding fringe benefits)	7.9%(17)	47.2%(102)	44.9%(97)
k. Vacation time, holidays and sick leave	1.4%(3)	51.6%(111)	47.0%(101)
l. Other fringe benefits	1.4%(3)	52.8%(113)	45.8%(48)
m. Turnover of employees	21.7%(46)	36.8%(78)	41.5%(88)
n. Customer relations	4.4%(9)	18.9%(34)	76.7%(58)
o. Workmen's compensation	0	27.1%(56)	72.9%(151)
p. Social Security payments	1.0%(2)	24.8%(51)	74.3%(153)
q. Union negotiations	0.8%(1)	21.8%(29)	77.4%(103)

The areas of scheduling, record keeping, supervision and turnover are the only ones in which co-op students may cost more for any significant number of employers (more than 10%). And even in these areas, the majority of the employers (65 to 78%) find co-op students to be no more costly than a regular worker.

Equally important as cost though is the quality of the co-op manpower relative to the use of a regular employee. Here again, according to the employers themselves, co-op students are almost always as good, and often better than are regular employees who do the same type of work. (See Table 1.21 below)

TABLE 1.21: COMPARISON OF QUALITY OF CO-OP STUDENT VERSUS REGULAR EMPLOYEE

% of Employers Indicating that Co-op Students are:	Better	Same	Worse
Motivation	67.8%(143)	28.0%(59)	4.3%(9)
Cooperation, ability to work with people	52.6%(111)	44.5%(94)	2.8%(6)
Ability to follow instructions	50.9%(108)	42.9%(91)	6.1%(13)
Communication skills	48.1%(101)	37.1%(78)	14.8%(31)
Technical knowledge	46.9%(98)	25.8%(54)	27.3%(57)
Dependability	46.2%(98)	48.1%(102)	5.7%(12)
Quality of work	45.7%(96)	37.6%(79)	16.7%(35)
Quantity of work	36.8%(77)	42.1%(88)	21.1%(44)

Also, in terms of the speed at which their productivity improves, most employers (57%) feel co-op students progress more rapidly, while fewer than 19 percent feel that a regular employee progresses faster. Thus, from the employers' own point of view, it seems clear that co-op students are providing them with an economical source of skilled manpower. The data also indicate that cooperative education programs are also providing employers with valuable sources of skilled permanent employees with the graduates of these programs. About 61 percent of the co-op employers surveyed feel that co-op graduates are more productive than other employees and 70 percent feel that their permanent employees, who were in a co-op program, progress faster than other employees in terms of their productivity.

This fairly strong evidence of the benefits of co-op to employers is also supported by the fact that almost all of the employers surveyed (97%) plan to continue their participation and a substantial number (41%) intend to expand the number of positions available to co-op students within the next year.

When asked to rate the importance of various possible incentives for participation or increased participation, the two factors most often cited as very important by both co-op and non-co-op employers were reimbursement for student training and direct wage subsidy. However, as seen in Table 1.22 below, even these were indicated as very important by only about one-third of those interviewed.

This fact, coupled with the evidence presented in this section, and in much more detail in Section IV of Chapter 2, that employers presently find cooperative education programs to be a sound and economical source of skilled manpower, would tend to imply that if very rapid expansion is not a goal, then the current Federal policy in support of co-op, which does not provide subsidies to employers, is a sound one.

TABLE 1.22: INCENTIVES TO (INCREASED) PARTICIPATION

% of Employers Rating Incentive as Very Important:

	Co-op	Non-Co-op
Reimbursement for co-op student training	36%(83)	28%(22)
Direct wage subsidy for the co-op student	28%(66)	30%(24)
Tax rebates	23%(50)	9%(7)
Availability of sufficient numbers of students on short notice for brief time periods	18%(43)	19%(15)
Government insurance program protecting employers against the consequences of serious co-op student errors	17%(40)	22%(17)
Accrediting your training operation as an educational institution	17%(39)	12%(10)
Public recognition in the form of college news releases, banquets, etc.	16%(37)	14%(11)
Faculty status for your staff who work with co-op students	15%(36)	8%(6)
Approaches to top management by political or business leaders	9%(22)	9%(7)
Reduction in minimum wage	7%(18)	6%(5)
Promise of union cooperation	5%(10)	9%(6)

2

ANALYSIS OF COSTS AND BENEFITS

The purpose of this chapter is to evaluate and compare the costs and benefits of cooperative educational programs from the point of view of all major participants. The major part of the analysis is concerned with the impact cooperative education has upon the student/graduate. However, the importance of the co-op program is also discussed from the perspective of the educational institution and the employer of co-op students.

The sections of Chapter 2 are as follows:

- Section I: Rate of Return and Graduate Analysis
- Section II: Analysis of Student Costs and Benefits
- Section III: Analysis of Institutional Costs and Benefits
- Section IV: Analysis of Co-op Student Employer Costs and Benefits
- Section V: Summary of Cost-Benefit Analysis Findings

Section I of this chapter makes use of rate of return analysis in order to measure the monetary net benefits of cooperative education to the prospective co-op participant (i.e., recent high school graduate) over the course of his/her lifetime. Elements of costs and revenues are adjusted and summed to provide a lifetime stream of net benefits for the individual. These streams are compared on the basis of a variety of educational and demographic characteristics. With this technique, a determination is made regarding the relative net benefits which accrue to the co-op participant as opposed to the individual following the more traditional non-co-op educational approach.

In addition, analysis will focus on specific parts of the co-op participants' schooling and career experience, including many non-pecuniary aspects. Qualitative analyses measuring job satisfaction, fulfillment of career plans, and speed of career advancement are also examined relative to co-op participation.

Section II considers in detail the costs and benefits faced by the co-op and non-co-op student. While Section I includes student costs as an element in the rate of return analysis, Section II extends the description of the student experience by examining extensive breakdowns of expenses and revenues as differentiated by co-op versus non-co-op student participation. Additionally, significant analysis is undertaken regarding attitudinal differences in educational goals, educational quality, and job preparedness as they differ for co-op and non-co-op students.

Section III explores the impact of co-op programs on the educational institution. The goal of this section is to identify the cost differentials inherent in the education of a co-op student as opposed to a non-co-op student. By the same token, differentials in potential benefits to the institution in terms of financial funding, fulfillment of educational goals, and sustained operation of the institution will be addressed. As a result, this portion of the analysis will be aimed at identifying the differentials in resource usage between co-op and non-co-op programs. In this manner an approximation can be made regarding the incremental differences in costs between types of programs.

Section IV explores the various costs and benefit elements of co-op education as they affect the employer of co-op students. The employer is viewed as an investor in co-op education. Employer costs are concerned with the training and evaluation of students. In return for this expense, the employer expects an immediate and a future return on this investment in the form of a readily available, trained labor pool. In addition, co-op investment may be viewed as being of positive benefit in terms of public relations.

In the case of the co-op student employer, the costs of training students are difficult to discern from other production costs. By the same token, the marginal benefits of co-op participation to the employer in terms of increased profits, lower information costs, and decreased labor search costs are nearly impossible to quantify without using highly sophisticated statistical techniques. As a result, Section IV will focus on indirect measures of the net gain to the co-op employer as a function of firm characteristics, degree of co-op participation, and labor market characteristics.

Chapter 2 concludes with a summary of the major impact co-op education has on the costs and benefits of each of the several participants. This summary is intended to describe the cost and benefit effects of co-op education taken as a whole. In highlighting the more significant findings of Chapter 2, the summary will address major questions such as:

- Does co-op education increase net pecuniary benefits to the participants?
- Does co-op education lower the financial and information costs to all participants?
- Does co-op education provide a sound, economical supply of labor to employers of students?
- Is co-op education a viable financial aid mechanism for students?

- Do the returns to co-op education vary by discipline area, sex, or length of the program?
- To what extent is the impact of co-op education on the participant reflected in the graduate experience as opposed to the student experience?

As an aid to the assimilation and understanding of the analysis of each of the first four sections, a brief and non-technical summary of the findings is provided at the end of each separate section. These summaries are provided because of the unavoidable complexity and length of the separate analytical sections, and because of the variety of audiences that are intended to be addressed.

I. RATE OF RETURN AND GRADUATE ANALYSIS

Introduction

The purpose of this section is to present results of the estimation of net benefits which accrue to the high school graduate as the result of a successfully completed college course of study. The financial parameters of the college experience are compared with the earnings experience of a high school graduate who does not enter college. That is, the decision being evaluated is that faced by a recent high school graduate who must decide upon a college education. The high school graduate contemplating further formal education is endowed with an income stream as a result of the high school education.[1] This endowment, or earnings stream, is foregone by the individual when entering college. In the postsecondary school years, it is a cost of education, and in the graduate years, its inclusion is necessary to compute the incremental graduate earnings attributable to the postsecondary education investment being evaluated.

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[1] The earnings of a high school graduate are considered an endowment created as a result of previous high school education. The use of the term endowment in this instance is suggested by Hirshleifer, J. in Investment, Interest and Capitol (Prentice Hall, Inc., 1970), Chapter 3, in order to avoid confusing terminology. The use of high school earnings in this study is not as an investment alternative (since whatever investment that took place did so prior to and outside of the time frame being dealt with here), but as one of the several cost components of the net benefit stream associated with investment in postsecondary education. In this sense, the Internal Rate of Return calculations below are evaluations of each single investment (i.e., some form of college education), in which the endowment stream is only one cost of making

In addition, the net benefits as calculated above for alternative college programs are directly compared. In this case, the net benefits of the one college program (e.g., co-op) will serve as the opportunity cost of the other (e.g., non-co-op), and vice versa, but will still be evaluated from the point of view of the recent high school graduate. That is, the net benefits of one of two mutually exclusive investment alternatives are compared to (i.e.,subtracted from) the net benefits of the other investment alternative, so that a choice between the two can be made by the recent high school graduate. Results are initially presented and compared based upon differences in four variables.

- Sex;
- Co-op versus non-co-op program;
- Discipline area; and
- Length of program.

One of the analytical tools to be used is rate of return analysis by which a determination will be made as to whether alternative educational programs are financially rewarding from

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Fn. continued from p. 2.4

that investment, and are not comparisons of alternative investment options. The Fisher's Rate of Return Over Cost calculations are used to compare mutually exclusive investment options. In these cases the endowment stream plays an insignificant role, because it enters the net benefit streams of all college investments in the same manner. The difference taken between any two such net benefit streams (as when comparing two mutually exclusive college investment options) is invariant with respect to the value of the endowment stream, since it appears in both the minuend and the subtrahend, it cancels out when the subtraction is performed.

the point of view of the prospective student. The variables listed above allow the analysis to address several pertinent questions relative to the net benefit streams associated with alternative educational programs. Some of the testable hypotheses to be addressed in the first part of Section I are as follows:

- Is a college education financially rewarding? That is, are cohort-specific internal rates of return above the range of current market interest rates?
- Are there discernable differences in returns to college education by sex, program length, co-op versus non-co-op, and discipline area?
- What are the combinations of the above variable as they define cohorts that are likely to be the most (and least) cost effective?
- At what discount rates (if any) do changes in financial reward rankings take place with respect to sex, discipline area, program length, and co-op versus non-co-op? Are these discount rates within the range of expected market interest rates?
- What are the cohort-specific net present values? Are there any systematic trends with respect to the four above-stated variables?

In addition, Section I addresses questions related to changes in other variables which were not stressed in the cohort specific analysis, but may nevertheless impact upon the financial returns from alternative educational programs. Specifically, some of the questions addressed in this additional analysis are:

- Does the local unemployment rate affect the lifetime graduate earning stream?
- Are there regional differences in graduate earnings?
- Does previous working experience, race, or graduate school attendance affect earning?
- Does the presence or absence of IV-D funding affect the earnings of those graduates who participate in co-op programs?

- Do the effects of unemployment rates, region, previous experience, graduate school attendance, or race vary by the co-op versus non-co-op status of the institution?

To address these questions in as precise a manner as possible, Section I is divided into three subsections. Subsection A is a synopsis of return and present value methodology sufficient to guide the reader through a discussion of the analytical results. Extensive discussion of the procedures used is found in the Technical Notes to Chapter 2. Subsection B contains the results and discussion of the rate of return and present value analysis. Subsection C deals with additional graduate analysis on variables not chosen for cohort definition. Subsection C is followed by a summary of the findings of the rate of return and graduate analysis in Subsection D.

A. Methodology

The analysis of benefits to participation in co-op education consists of four steps:

- Selection of population cohorts based upon a set of individual characteristics for which lifetime cost and benefit streams will be calculated.
- Construction of the lifetime cost and benefit streams for each cohort. This involves the creation of adjusted streams of student and graduate earnings, student costs, and foregone earnings (i.e., the high school graduate's endowment).
- Calculation of the internal rates and present values for each cohort-specific net benefit stream, and comparing the experience of different cohorts through the calculation of Fisher's Rate of Return Over Cost (these techniques are described below).
- Conducting additional analyses and comparisons based upon characteristics not stressed in the rate of return analysis.

1. Cohort Characteristics Selection

Two primary criteria were used in cohort characteristic selection. First, it was imperative that the characteristics chosen represent the most useful area for analysis: those that have the greatest impact upon lifetime net benefit streams. Second, it was necessary that the number of characteristics selected was not so large as to reduce cohort sample sizes below that which will make the analysis meaningful. Based upon these criteria, four variables were selected for use in the rate of return analysis.

a. Co-op Versus Non-Co-op Status

This is the most important characteristic for comparison and is necessary to fulfill the purposes of this study. The primary question is whether co-op education offers the prospective student a lifetime economic advantage not present in non-co-op courses of study.

b. Program Length

Student costs vary significantly depending upon whether the program is two, four, or five years long. During that time, the student foregoes earnings resulting from high school education.[1/] It is important to determine whether increased years of schooling develop an increased earning capacity which compensates for the higher costs associated with longer programs. Additionally, co-op versus non-co-op differences must be explored in this matter.

c. Discipline Area

Different discipline areas will place the student in varying occupations for which the labor market offers differing returns. Additionally, it is hypothesized that co-op programs are more successful when greater numbers of available student

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[1/] An individual at each stage of his/her college career actually foregoes earning commensurate with a partially completed college education, but high school earnings are used in this analysis because a single completed college education option is being evaluated from the point of view of a recent high school graduate.

jobs exist, which, in turn, is particularly sensitive to a discipline area. The discipline areas used are Engineering & Architecture, Business & Management, Liberal Arts, Health Professions, and Trade & Industrial.

d. Sex

Earnings, labor participation rates, and other labor force characteristics have traditionally varied significantly by sex. Also, the use of Census earnings figures in the analysis requires that the sample be broken down by sex.

These four characteristics define a maximum of 60 possible cohorts within the rate of return and graduate analysis. Many of these cohorts were eliminated from consideration due to insufficient sample sizes. All cohorts with less than four observations were eliminated from the analysis. While all those with four or more observations were analyzed, it should be kept in mind that the reliability of results developed from these smaller cohorts may be suspect. Particular care should be taken in interpreting results from cohorts where the sample sizes are less than 10. As explained in the Technical Notes to Chapter 2, these sample sizes represent the number of graduate observations three years from the date of graduation. They are not integers due to the fact that an average of available monthly observations was taken to arrive at these figures. Sufficient observations were available to conduct rate of return and graduate analysis on 28 population cohorts. This was in excess of the 10 to 15 initially expected. Finally, it should be noted that unless otherwise stated, the observations on graduates represent both the 1970 and 1973 graduating classes pooled according to years out of school and, of course, adjusted for inflation. The cohorts and their corresponding sample sizes are shown in Table 2.1.

TABLE [illegible].1: COHORT SAMPLE SIZES[1]

Program Length	2 Year				4 Year				5 Year[2]
Discipline	Co-op		Non-co-op		Co-op		Non-co-op		Co-op
	Male	Female	Male	Female	Male	Female	Male	Female	Male
Engineering & Architecture	5.9	X	9.2	X	75.5	X	117.1	X	143.8
Business & Management	16.1	30.6	64.8	102.4	45.7	5.8	111.4	24.3	27.8
Health Professions	X	6.4	X	36.0	X	X	11.0	33.8	X
Liberal Arts	4.0	10.9	44.0	43.6	13.9	10.7	143.8	111.7	X
Trade & Industrial	X	X	25.2	X	X	X	8.0	X	X

[1] Cohorts with samples less than 4 are indicated with an "X".

[2] No observations were made on females or non-co-op males with 5-year program lengths.

2. Construction of Cohort-Specific Net Benefit Streams

The elements of the cost and benefit streams and their adjustments are divided into four main groups:

- Elements of the student experience: costs, tuition, taxable and non-taxable student earnings;
- Graduate earnings from the graduate sample adjusted by comparison with appropriate Census earnings figures;
- Foregone earnings for both students and graduates using the expected earnings represented by the endowment of a high school graduate of the same age and sex; and
- Adjustments for cross-section data bias, taxes, and probability of survival.

The incremental net benefits at time t for cohort i (N_t^i) are evaluated from the elements listed above according to equation (1):[1]

$$(1) \quad N_t^i = S_t^i \left[Tx \cdot \left(1.015^t \cdot G_t^i + ET_t^i\right) - Tx\left(1.015^t \cdot E_t^i\right) + NT_t^i - T_t^i - C_t^i \right]$$

where each element in this equation is as follows:

a. C_t^i: Student Costs for Cohort i at time t

Expenses for books, tools, supplies, and other necessities were summed for each student. Data for individuals were then aggregated by program length, co-op participation, discipline area, and school; and means calculated. Males and females were assumed to face the same expenditure levels. The mean cohort expenditures for each school were then averaged (with each school weighted equally) to arrive at a cohort-specific mean expense figure. In this process, expenditures for food, housing, and transportation were excluded due to the fact that the small marginal differences in these costs that could be attributed to college education could not be accurately measured from the study data, given the number of cohorts to be examined and the high variances associated with these data items.[2]

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[1] Data were used only from schools where both student and graduate data could be obtained.

[2] That is, with the small sample sizes of the cohorts, and the high variability of the data, most of the differences calculated between cohorts for Fisher's Rate of Return Over Cost should be due to stochastic influences and would only serve to cloud the true differences represented in other cost items. In addition, for Internal Rate of Return Calculations, only those transportation, food, and housing costs which are attributable to school attendance should be included in the calculations, but since no base-line data are available (i.e., the level of such costs for comparable persons not attending school), and since the costs so associated with school attendance are small relative to the total transportation, food, and housing costs reported; the inclusion of total costs would seriously bias the results.

b. T_t^i : Tuition for Cohort i at time t

Mean student tuition expenditures were calculated by program length and school. Within each program length, school-specific mean tuitions were averaged (with each school weighted equally) to arrive at a single tuition figure for each program length.

c. ET_t^i : Student Taxable Earning for Cohort i at time t

Taxable income consisting of earnings from co-op employment, non-co-op employment, and summer employment were aggregated for each student and means calculated by cohort, school, and year in school. (It was postulated that earnings will vary by year in school.) The cohort by year in school means were then aggregated across schools using the number of graduates in the sample as weights, and an overall mean thereby calculated for each cohort by year in school.

d. NT_t^i : Student Non-Taxable income for Cohort i at time t

Mean yearly non-taxable income figures consisting of grants, subsidies, scholarships, and fee waivers were calculated for each cohort by year in school in precisely the same manner as was taxable earnings. Parental support was excluded essentially for the same reason as the transportation, food, and housing expenses discussed above in A.2.a.

e. G_t^i : Graduate Earnings for Cohort i at time t

Lifetime graduate earnings were estimated from a maximum of six years of questionnaire data. In most cases only three years of data were available. Due to this fact, it would be inappropriate to lend much credence to the validity of the absolute magnitudes of the cohort-specific net benefit streams. More important comparisons can be made among the relative magnitudes of the benefit streams.

To approximate the lifetime earning experience of each cohort, comparisons were made between graduate questionnaire data and lifetime streams constructed from Census earnings data.

Census earnings streams were constructed for each cohort (i.e., discipline area-sex-program length combination) as described in detail in the Technical Notes to Chapter 2, and these base lifetime income profiles adjusted on the basis of a comparison of the first five years with corresponding graduate earnings data. Earnings data was used rather than income data due to the fact that the impact of educational attainment is more substantially reflected in earnings data. Also, Census earnings figures are reported in approximately the same cohort-specific terms as were used in this study.

Census earnings figures were adjusted and specifically allocated in order to correspond to cohort-specific graduate sample figures. Five discipline areas in the graduate and student samples were defined in terms of college major, whereas no such breakdowns exist in the Census data. Thus, an interface had to be developed whereby specific Census occupations could be allocated to one of five discipline areas (or omitted in some cases). Raw earnings figures for each cohort were established by assigning each occupational group earnings figures to a specific discipline area according to its population weight in the Census data.

Some adjustments to the graduate sample data were made before they were compared with the Census earnings figures. Primarily, adjustments were made for inflation which took place between the time of Census collection and the sample survey. After adjusting for inflation in the sample data, Census data were weighted by labor participation rates within the population. Earnings from those individuals who were employed sometime during the survey year were weighted to account for the entire civilian population within a cohort specific by educational level, sex, and discipline area.

f. E_t^i : Endowment Stream for Cohort i at time t

This study aims to measure the incremental benefit of a college education. In effect, this is an evaluation of a specific investment alternative: the completion of a college program. The gain to the college graduate is the difference between the earnings stream associated with the college graduate and the endowment stream of the high school graduate. As a result, the value of the high school was subtracted from each of the graduate earnings streams. This was true for the college non-earning years as well, since the student also foregoes the high school endowment during this period. These foregone earnings were also weighted in our analysis to account for labor force participation.

g. 1.015^t : Cross-Section Data Bias Adjustment at time t

To account for the secular growth of earnings over time, graduate earnings streams for each cohort, as well as high school foregone earnings, were increased by approximately the annual rate of productivity increase historically realized in the United States: 1.5 percent per year. This adjustment is necessary when constructing time series earnings from cross-section data in order to take account of expected future productivity increases.

h. Tx: Tax Adjustment

Selected student earnings, graduate earnings, and foregone earnings were taxed in order to measure the private rather than social return to college education. The variable Tx represents the proportion of earnings retained by the participant, and is specific to the earnings level of the year t under consideration.

i. S_t^i : Survival Adjustment for Cohort i at time t

After estimating the net lifetime benefits realized by a program graduate of a certain cohort, the benefits for each year were adjusted for the life expectancy of the individual. S_t^i represents an age and sex-specific probability of survival from graduation to year t.

3. Rate of Return Methodology

Having calculated the individual elements of the net benefit stream, N_t^i, the next step in the analysis is to convert each alternative lifetime net benefit stream into a point estimate. There are three interrelated procedures traditionally used to do this, each with a different purpose. All, however, involve the discounting of the stream of net benefits for each cohort back to the time of high school graduation when the decision among mutually exclusive alternatives is assumed to be made. These three techniques are the calculation of Internal Rates of Return, Present Values, and Fisher's Rate of Return Over Cost.

a. Internal Rate of Return

The question of whether a particular college investment is financially rewarding within a range of feasible market interest rates may be answered by finding the discount rate at which they cease to become profitable. If this discount rate is well above the market rates that might normally be expected, it can be stated that the particular investment is profitable. This discount rate may be found for cohort i by solving equation (2) for ρ:[1]

$$(2) \qquad \int_0^n \left(N_t^i\right) e^{-\rho t}\, dt = 0$$

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[1] The formulation represented by equations (2), (3), and (4) are close approximations to the algorithm actually used in the study. The step function representing net benefits were converted to continuous functions over one year intervals and continuous discounting was applied to each interval by integration. Continuous discounting represents the limit of discrete discounting as the time interval between discrete discounting approaches zero (or as the number of intervals in a fixed time period approaches infinity):

1/ Footnote continued from page 2.1 .

$$\lim_{x \to \infty} \sum_{t} \left(\frac{1}{(1+\frac{r}{x})^{t/x}} \right) = e^{-rt}.$$

As a practical matter, continuous discounting results in a slightly higher level of discounting because of the compounding effect. For example, at a rate of discount of 10 percent, the discount factor is .909 with discrete discounting, whereas it is .905 with continuous discounting.

That is, $e^{-.1} = .905$, while $\frac{1}{1.1} = .909$.

The use of continuous discounting will produce a lower present value than discrete discounting when using the same discount rate r. This is equivalent to saying that continuous compounding will cause a sum to grow faster than when compounding at finite intervals, even though the compounding rate is the same. The appropriate concept to use when dealing with human capital and the rate of time preference of individuals is continuous discounting. By the same token, however, when dealing with actual housing in the money market, the appropriate concept depends upon the contractual nature of each individual loan, the payback provision, etc. Nevertheless, since actual housing and lending is a small portion of the total cost-benefit package being evaluated, continuous discounting remains the more appropriate concept.

The reader should be aware of the possibility of small differences when comparing the results of this study with those of others that employ discrete discounting (compounding) because of data constraints or simplicity. Such differences will be very small, however, and are likely to be swamped by errors of measurement, assumptions regarding income profile construction, the use of all interval data, etc.

The specific algorithm actually used employs continuous discounting, and is designed to smooth step-function net benefit streams. For example, let t_1 be the elapsed time in years from the initial investment to the attainment of any level of the net benefit step-function, and let t be the elapsed time in years to the end of the step, then the flow of net benefits from t_1 to $t_1 + t$ is represented by the linear function $(a + bt)$, where a is the net benefit level of the current step and a + b is the net benefit level of the next step, and, for unitary intervals.

$$\int_0^1 (a + bt)e^{-r(t_1 + t)}\, dt \equiv - \left(\frac{a}{r} + \frac{bt}{r} + \frac{b}{r^2}\right) e^{-r(t_1 + t)} \Bigg|_0^1 .$$

After evaluation this integral between each adjacent pair of net benefit step-function levels, the values are summed to obtain the total present value.

where,

N_t^i represents the net benefit stream as calculated in equation (1) for cohort i,

n is the years of working life from high school graduation to age 65, and

ρ is the Internal Rate of Return.

b. Present Value

In order to determine the net worth of a particular college course of study, equation (3) is evaluated at a variety of plausible discount rates. In evaluating the results, the greater the present value at any particular discount rate, the more financially rewarding the education program is at that discount rate. Equation (3) was used to evaluate cohort net benefit streams at discount rates ranging from 0 to 20 percent to ensure that the range of potential interest rates in the money markets available to the student is covered.

$$(3) \qquad PV_r^i = \int_0^n \left(N_t^i\right) e^{-rt}\,dt$$

where,

PV_r^i = the present value of the net benefit stream of cohort i at discount rate r,

r = discount rate ($PV_r^i = 0$, if $r = \rho$ as in equation (2)),

n = the years of working life from high school graduation to age 65, and

N_t^i = the net benefit stream for cohort i.

c. Fisher's Rate of Return Over Cost

Fisher's Rate of Return Over Cost is the discount rate at which two mutually exclusive investments are equally rewarding (i.e., have equal present values). Above this rate, one alternative is preferred, and below, the other is preferred. It is possible for Fisher's rate of Return Over Cost not to exist, however. This indicates that the net benefit streams of the two investments never cross, and one investment dominates the other at all interest rates. When using present value calculations in the presence of a variety of investment options, a large number of one-on-one comparisons must be made, particularly when the relevant market interest rate is not known. In this situation, Fisher's Rate of Return Over Cost provides a helpful short-cut because it is a single, unambiguous measure whereby a judgment can be made as to the relative attractiveness of two mutually exclusive investments at all rates of interest.

Additionally, present value calculations provide cardinal measures of the financial rewards associated with each given investment option. As stated earlier, due to the constraints on the number of years for which graduate data could be obtained, these figures are likely to be suspect. To the extent that all constructed earnings streams contain biases of the same direction, the accuracy of the Fisher's Rates will not be substantially affected. Thus, Fisher's Rates will be relied on heavily to indicate ranges of interest rates over which selected investment options are to be preferred, rather than using present values of returns at a given rate of interest.

To determine the effect sex, discipline area, and co-op/non-co-op status have on the private returns from alternative courses of study, selected net benefit streams were compared two at a time with only one of the cohort-determining variables varying. For example, when examining the impact of discipline area on the cost-effectiveness of college education, program length, sex, and co-op/non-co-op status would be held constant. In this manner, the impact of each individual variable may be determined by the establishment of the discount rate (f) found by solving equation (4):

$$(4) \qquad \int_{o}^{n} \left(N_t^1 - N_t^2\right) e^{-ft}\, dt = 0$$

where,

n = the years of working life from high school graduation to age 65,

N_t^1 and N_t^2 = the net benefit streams of two mutually exclusively educational investments, and

f = Fisher's Rate of Return Over Cost.

Note that Fisher's Rate of Return Over Cost in equation (4) exhibits a similarity to the calculation of the internal rate of return in equation (2). The internal rate evaluates a particular investment (college education); Fisher's Rate of Return Over Cost, on the other hand, compares mutually exclusive alternative investments (co-op versus non-co-op college education). The theory and algorithms involved in these two calculations are the same, although the interpretations of the results are quite different.

d. Integration of Techniques

All three of the techniques described above are related and must be internally consistent, but each conveys a different bit of information to the analyst. The only one of the three techniques which represents a cardinal measure of the profitability of each investment option is the present value determined by discounting the entire net benefit stream at the current market rate of interest (i.e., the rate of interest which the investor would have to pay if borrowing the funds necessary for the investment). Unfortunately, the market rate of interest is seldom known when conducting a general analysis. The best that can be done is to identify the range of potential interest rates. In this study, the range to be considered is between zero and 20 percent.

Rather than calculating present values for each investment option at all possible rates of discount within the relevant range, and having to wade through literally thousands of present values, it is best to calculate present values at discrete five percentage point intervals to get a feel for the levels of profitability and then to rely on a couple of "short-cuts." These "short-cuts" are the Internal Rate of Return and Fisher's Rate of Return Over Cost.

The internal rate of return for this study is that rate of discount at which the present value of the net benefit stream of a particular investment option; i.e., the algebraic sum each year of the option's lifetime (1) direct costs (such as tuition), (2) indirect costs (such as the high school endowment earnings foregone by attending a postsecondary institution), and (3) lifetime earnings (such as scholarships, student earnings and graduate earnings); equals zero. This is the market rate of interest at which the investment option under consideration ceases to be financially viable. If the internal rate of return is below the relevant range of interest rates, the option is not attractive at any interest rate within the range, so that the examination of a series of present values is unnecessary. On the other hand, if the internal rate of return is above the relevant range of interest rates, the option is profitable at any probable market rate of interest. If the internal rate of return falls within the range of relevant market interest rates, then one must have more specific knowledge regarding probable interest rates to decide if the option is financialy rewarding. Thus, we have the rule that if the internal rate is above the market rate or the range of market rates, the investment gains a positive return, and *vice versa*.

Note that the internal rate indicates only the range of profitable interest rates for the option under consideration, but not how financially rewarding the option is. Only the present value at a rate of discount equal to the market rate of interest describes the level of pecuniary returns to the investment option. Using the internal rate as an investment criterion among mutually exclusive alternatives will not guarantee the selection of the most attractive investment option. That is, if option A has a higher internal rate than option B, this does not necessarily mean that option A has a higher present value at the market rate of interest than option B. Internal rates will determine if either or both of the options have positive returns, but not which has the highest returns. (If the market rate of interest is between the internal rates of options A and B, then logic does imply that option A is preferred.)

One short-hand method of comparing two investment options directly is to calculate a Fisher's Rate of Return Over Cost. Recall that internal rates are evaluations of college training. Fisher's Rate employs the same mathematical algorithm, but compares two college investments directly (say, co-op and non-co-op college training). One option is considered the opportunity cost of the other, and the net benefit stream used is the algebraic difference between the net benefit streams used in the internal rate calculations for each alternative. (Note that the high school endowment in the net benefit stream for each investment alternative cancel each other out.)

Fisher's Rate is defined as that rate of discount at which two mutually exclusive investment options have equal present values. At this rate of discount, one is indifferent between the two options. Also note that above this rate, one option is always preferred (has a higher present value), whereas below this rate, the other option is always preferred (has a higher present value). By knowing the position of Fisher's Rate of Return Over Cost relative to the probable range of interest rates, one can unambiguously state which option has the higher present value (i.e., is preferred as the more financially rewarding) within the range of market interest rates without examining the entire series of present values. Again, however, the determination of how much more rewarding (in terms of present values) one investment option is over the other requires a comparison of present values at the prevailing market rate of interest.

Figure 2.1 illustrates the relationships among the three techniques. Portrayed are two college investment options, A and B. The internal rates of return for each are labeled r_a and r_b, respectively. Note that the present value of each option is zero at these respective rates of discount. At market rates of interest below each internal rate, the option under consideration has a positive return (i.e., has a positive present value). If the market rate of interest is r_1, only option A has a positive return.

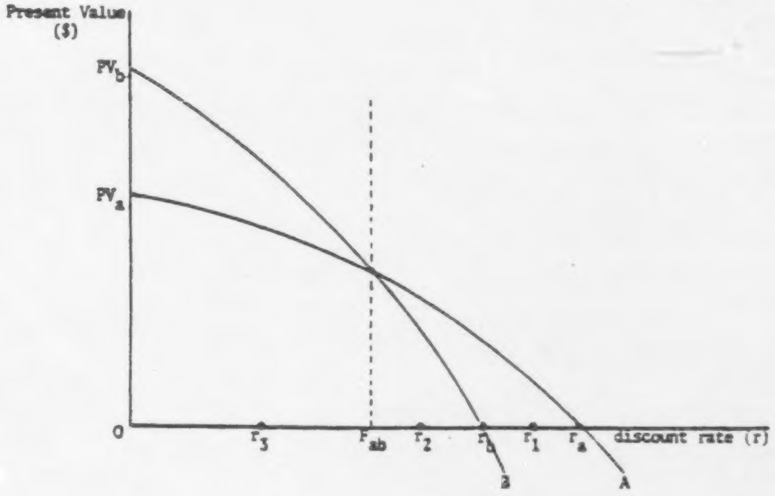

FIGURE 2.1: COMPARISON OF INVESTMENT ALTERNATIVES--PRESENT VALUES, INTERNAL RATES, AND FISHER'S RATE OF RETURN OVER COST

Fisher's Rate of Return Over Cost is the rate of discount, F_{ab}, at which the present value of the two options, A and B, are equal. The investor is indifferent between the options at this rate of discount.

Note, however, that at market rates of interest above the Fisher's Rate, say, r_2 or r_1, Option A is preferred, whereas at market rates of interest below the Fisher's Rate, say, r_3, Option B is preferred. Also note that choosing option A on the basis of the fact that $r_a > r_b$ is correct if, and only if, the market rate of interest is above F_{ab}. Using only information on internal rates, one could make a correct choice only if the market rate of interest were above r_b. At market rates of interest below r_b, one must either calculate present values or use Fisher's Rate to determine which is the more financially rewarding. The preferred procedure is to calculate F_{ab} first because it may lie outside of the range of relevant market interest rates, in which case the preferred option can be chosen unambiguously even without more specific information as to the exact level of the market interest rate or the exact levels of the present values.

4. Additional Graduate Analysis

Several variables which were hypothesized to have an effect upon the earnings and non-monetary experience of graduates were either not stressed or were not included in the rate of return analysis. Constraints on cohort sample sizes were major factors for these exclusions. That is, breakdowns of the existing graduate data with respect to additional variables would have made analysis difficult, if not meaningless due to inadequate cell or cohort observations. Nevertheless, the impact of these additional factors upon the graduate pecuniary and non-pecuniary experience can be explored. Such an explanation is necessary, for example, because a high correlation between one of these additional factors and one of the cohort definition variables may, in the absence of additional analysis, lead to spurious conclusions regarding the significance of the cohort definition variables. The additional analysis may also serve to explain observed differences in rates of return.

To facilitate the discussion of methodology, this portion of the analysis is presented in two parts:

- Further analysis of graduate earnings, and
- Analysis of other aspects of the graduate experience.

a. Additional Analysis of Graduate Earnings

It was hypothesized that several variables, along with those defining the population cohorts, might affect the individual's lifetime stream of earnings. Those variables considered in the additional analysis are as follows:

- Area Unemployment Rate;
- Region;
- Race;
- Post-Graduate Education;
- IV-D Funding (for co-op institutions);
- Previous Working Experience; and
- Labor Force Participation.

In order to examine the potential effects of these variables on economic returns to the graduates in various cohorts, tabulations were made of graduate earnings as they vary with these variables, and t-tests performed to determine if these variables significantly affect mean graduate earnings. In addition, graduate earnings were broken down by co-op/non-co-op status to determine if differential effects can be attributed to these variables when controlling for program type. Further analysis was undertaken to determine whether differentials in discipline-specific earnings were attributable to varying participation rates.

b. Other Graduate Experience

The impact of differing courses of college study may manifest itself in non-pecuniary terms as well as monetarily. The last part of the graduate analysis addresses these effects. It is hypothesized, for example, that co-op education may induce differentials in the following factors:

- job satisfaction;
- frequency of unemployment;
- fulfillment of career plans; and
- career advancement.

In this portion of the analysis, direct and indirect measures of job satisfaction were examined to determine if they varied with respect to the co-op versus non-co-op status of the institution or according to other graduate characteristics. It was initially hypothesized that co-op graduates, because their college experience is more job-oriented, are more likely to be satisfied with their jobs. Chi-Square tests were performed to test for any significant differences in the co-op versus non-co-op response patterns. It was also hypothesized that co-op graduates have stronger contacts with the job market and, due to specialized training, are more employable. As a result, it was expected that co-op graduates would experience fewer periods of unemployment, and of shorter duration. A t-test was used to determine if there were any significant patterns relating unemployment experience to co-op/non-co-op status and previous working experience.

One of the projected strengths of cooperative programs is the direct relationship between college training and career requirements. It was theorized that co-op graduates obtain jobs that are more closely related to their long-term career plans. As a result, Chi-Square tests were performed to determine if, in fact, co-op graduates were more successful in fulfilling their career plans. Lastly, it was conjectured that co-op graduates might possess an advantage in terms of their potential for career advancement. Greater success in matching college training to career choice might reflect itself in terms of more rapid salary increases. A t-test was performed to determine if there were any significant co-op/non-co-op patterns in the variables measuring salary change.

B. Results of Rate of Return Analysis

As described in the previous methodology, three variations of rate of return analysis were employed to measure differences in cohort-specific net benefit streams: Internal Rate of Return, Present Values, and Fisher's Rate of Return Over Cost. Each of these will be described in turn.

1. Internal Rate of Return

Internal rates of return were calculated for the net benefit stream of each cohort. These results are presented in Table 2.2. Three observations should be made concerning these data:

TABLE 2.2: INTERNAL RATES OF RETURN FOR COLLEGE GRADUATES BY COOPERATIVE AND NON-COOPERATIVE EDUCATION PROGRAMS, LENGTH OF PROGRAM, AND DISCIPLINE AREA 1/

Discipline Area	COHORT CHARACTERISTICS								
	2-Year				4-Year				5-Year
	Co-op		Non-Co-op		Co-op		Non-Co-op		Co-op
	Male	Female	Male	Female	Male	Female	Male	Female	Male
Engineering & Architecture	> 35.0	X	> 35.0	X	32.8	X	21.8	X	25.1
Business & Management	32.0- > 35.0	> 35.0	25.9	> 35.0	33.4	> 35.0	16.6	17.0- 21.6	20.7
Health Professions	X	33.2	X	31.1	X	X	6.5	30.5	X
Liberal Arts	12.7	16.4- 18.4	11.7	22.3	22.3	27.5	6.0	17.7	X
Trade & Industrial	X	X	> 35.0	X	X	X	12.6- 22.6	X	X

1/ All values expressed in percentages, ranges are indicated where differences in assumptions regarding the construction of the graduate earnings profile affected the internal rates by more than 1.5 percentage points. Cohort sample sizes less than 4 are indicated by an "X".

a. In some instances, two values are reported for the internal rate of return for a particular cohort. This is the result of alternative adjustment specifications for the graduate earnings stream as estimated from Census data. In some cases, the earning observations taken from the graduate sample exhibited some ambiguity as to their secular trend. In these cases, the Census earnings data were adjusted according to alternative assumptions as to the true relationship. Tests were then made in order to determine if the rate of return analysis would be sensitive to the alternatives. When a difference of more than 1.5 percentage points occurred, both the high and the low results are reported. From a comparison with Table 2.1, it will be noted that alternative specifications were generally retained for cohorts with the lower sample sizes. A detailed explanation of graduate earning adjustments is contained in the Technical Notes to Chapter 2.

b. For a substantial portion of the available cohorts, the internal rates of return are simply reported as being greater than 35.0 percent. Values greater than this were considered irrelevant to meaningful analysis by virtue of being outside of the relevant range of market rates of interest.

c. Internal rates of return calculations are often subject to misinterpretation. They cannot properly be used to rank the alternatives. They are not measures of the lifetime value of the benefit streams to the student/graduate. Rather, they provide an upper bound to the market interest rate at which the investment is rewarding. This means that the investment options under consideration cease to be profitable only if one were forced to borrow funds to cover the cost of the investment at a market rate of interest above the internal rate of return. With the use of the internal rate of return, one can state only whether an investment is financially rewarding given an assumed market rate of interest. The level of the financial reward is determinable only from present value calculations.

Examination of Table 2.2 shows that, in general, the internal rates of return were unexpectedly high. Of the 28 available cohorts, 21 exhibited internal rates above 20 percent, and 12 above 30 percent, while only two were less than 10 percent. It was expected that college investment would be profitable over a wide range of interest rates, but those results are higher than expected.[1] Rather than stress the absolute levels of internal rates and Present Values exhibited in the data, however, it appears more productive to associate differences in the internal rates as calculated with variations in the cohort definition variables. In this manner, the relative importance of each cohort parameter may still be accurately assessed.

Program length appears to have had a strong impact on the internal rate. Twelve pairs of cohorts vary only in terms of program length. Of these, the 2-year programs indicate their cost-effectiveness at higher rates of interest in 10 of the comparisons, the two exceptions being co-op, Liberal Arts cohort comparisons. This relationship means that 2-year programs are profitable over a wider range of interest rates than 4-year programs. It does not mean that 2-year programs are more profitable at the current market rate of interest. The two available 5-year cohorts exhibit lower internal rates of return than either the 2- or 4-year programs which share the same discipline area, sex, and co-op/non-co-op parameters, so that the prospective investor has a more limited range of market interest rates at which the 5-year investment option will be profitable than for either the 2-year or the 4-year option.

Eleven pairs of cohorts vary only in terms of co-op/non-co-op status. Of these pairs, all but one show the co-op program to be profitable over a wider range of interest rates. Only the male, 2-year, liberal arts cohort is an exception. In fact, most of the co-op cohorts show internal rates above 35 percent, and the only two rates below 10 percent were for non-co-op cohorts.

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[1] There are several known reasons for these high returns as well as several other potential causes. Each will be briefly described.

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[1] Footnote continued from page 2.28.

- Some student expenditure items could not be included in the calculation of the net benefit streams which biased the net return upwards. These expenditure items include transportation, clothing, food, and housing costs which may have been incurred as a result of undertaking postsecondary education.

- While student loans were included as student benefits during the school years, the principal and interest payback were not subtracted from the earnings stream following graduation. This does bias the calculated returns upward, but the bias is likely to be consistent among cohorts.

- This study measured the returns from a completed college education and therefore did not provide for the probability of dropping out of school prior to graduation. Such a consideration will cause the calculated returns to be higher than otherwise.

- Because the evaluation was of a completed college education from the point of view of a recent high school graduate, the initial endowment remained the age adjusted earnings of a high school graduate. Many studies evaluate a series of continue-dropout decisions throughout the education experience which changes the endowment as the level of education increases. For these evaluations, the net graduate earnings for a graduate of a 4-year program would be the earnings of a dropout with three years of training. Obviously, the returns measured in this study are higher than those of studies which measure only the marginal earnings increment from marginal additions to the educational level. We are measuring the earnings increment to the entire college education experience, which is, of course, much higher.

- The functional form chosen to convert the census internal data to a continuous function may have understated the first few years of the census earnings stream. If this is the case, then the typical upward adjustment of the entire lifetime profile on the basis of the first three to six years of graduate data may have been erroneous. The upward bias should be fairly consistent among cohorts, however.

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[1] Footnote continued from page 2.29 .

- Whatever level of upward adjustment that is justifiable during the early years of the graduate earnings profile may not be justifiable throughout the entire lifetime profile, but with only three to six years of comparative data, the tendency for the difference to disappear cannot be accurately measured.
- Certainly the occupational mix of the graduate data differs from that of the census data which would represent a positive earnings differential in favor of the graduate data.
- By the same token, the sample of schools is not nationally representative so that the graduate earnings could be overstated when compared to the nationally representative census data.
- Between 1969 and the data acquisition of 1976, there could have been real income increases as reflected in the graduate data compared to the census data. While these adjustments would have been accounted for, similar adjustments were not possible for the high school earnings. This would cause an overstatement in the true earnings differential attributable to postsecondary education.

All of these factors combine to produce returns which are higher than those reported in other studies. Some of the reasons are results of the data available for the study, some due to analytical assumptions, and the remainder due to the nature of the specific decision being evaluated. By far the most important, both empirically and theoretically, is the latter. The returns calculated for this study are for a completed college course of study from the point of view of a recent high school graduate. It is not the evaluation of a sequential series of decisions throughout the postsecondary educational process, which would, of course, represent a much lower net return given the secular increase in the opportunity costs of those sequential decisions.

Examination of Table 2.2 shows that nine cohort pairs vary only with respect to sex. In all nine cases, the female cohorts are financially rewarding over a wider range of interest rates than are the corresponding male cohorts. This male/female differential in the range of profitable interest rates is larger for non-co-op programs, which suggests that co-op participation tends to equalize the ranges of interest rates over which males and females can expect their educational experiences to be financially rewarding. That is, co-op participation produces positive returns to both males and females over approximately the same range of interest rate. This does not mean, however, that the levels of financial payoffs are the same. Such a determination must await the Present Value and the Fisher's Rate of Return Over Cost analysis below.

Examination of rates of return by discipline area clearly shows that Engineering & Architecture and Business & Management cohorts have the widest range of profitable interest rates. Health Professions is associated with the next lowest range and Liberal Arts clearly has the smallest range. The Trade & Industrial cohort is difficult to compare because there are only two observations available.

While judgments can be made as to which programs are most likely to be profitable once the probable range of interest rates is known, the internal rate calculations are not measures of the financial rewards to alternative educational programs. Measures of such rewards may be obtained only by calculating present values at selected probable market rates of interest.

2. Present Value Calculations

The next major component of the rate of return analysis is measuring the financial payoffs to alternative courses of study. Accordingly, present value calculations (as per equation (3)) were made at discount rates between 0 and 20 percent by 5 percent intervals for all 28 cohorts. The results of these calculations are presented in Table 2.3.

The ranges of present values are significant. At a discount rate of zero percent, these values vary from a high of $545,299 to a low of $23,273. As the discount rate increases to 20 percent, the high and low present values fall to a range of from $8,382 to -$7,150. In actuality, the present values of most concern for each cohort will be found at discount rates somewhere between 0 and 20 percent, since most individuals have access to (i.e., can borrow) funds at market interest rates that fall within this range. It is important, however, to assess the sensitivity of alternative cohort net benefit streams to changes in the assumed market rate of interest (i.e., changes in the discount rate).

It will be noted that some of the cohorts have negative present values at higher rates of interest. The interpretation of this result is clear. This is the present value of the net lifetime loss to the participant should he/she engage in that course of study at that market rate interest. Present values become negative at that discount rate where the investment ceases to be cost-effective: at the internal rate of return as indicated on Table 2.2. Comparison of Tables 2.2 and 2.3 will show this correspondence between the internal rate of return and the present values.

While some caution must be exercised in the interpretation of the absolute levels of the point values shown because of the constructed nature of the graduate earnings stream, comparisons among cohorts provide some interesting conclusions:

- Business & Management and Engineering & Architecture appear to be the most rewarding discipline areas so that an individual would be financially better off by choosing one of these discipline areas for a career.[1] The preference for these discipline areas, however, is less pronounced at higher interest rates.

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[1] This statement leaves out Trade & Industrial cohorts since only two are available for comparison, and one of these has a very broad range of estimates.

TABLE 2.3: PRESENT VALUES AT ALTERNATIVE DISCOUNT RATES FOR COOPERATIVE AND NON-COOPERATIVE EDUCATION PROGRAMS BY PROGRAM LENGTH. DISCIPLINE AREA, AND SEX[1]

COHORT CHARACTERISTICS	2-YEAR				4-YEAR				5-YEAR
	CO-OP		NON-CO-OP		CO-OP		NON-CO-OP		CO-OP
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE
DISCOUNT RATE = 0 PERCENT									
Engineering & Architecture	154,408	X	278,365	X	293,351	X	280,836	X	337,578
Business & Management	211,156-399,456	124,621-208,837	238,625	121,499-197,207	545,299	236,701-295,623	272,553	85,097-152,847	357,718
Health Professions	X	181,539	X	158,819	X	X	23,273	294,387	X
Liberal Arts	69,146	52,246-78,370	68,138	118,880	244,738	202,392	53,393	143,948	X
Trade & Industrial	X	X	279,698	X	X	X	80,677-325,268	X	X
DISCOUNT RATE = 5 PERCENT									
Engineering & Architecture	41,475	X	78,404	X	78,807	X	69,538	X	84,606
Business & Management	54,262-105,687	37,727-59,709	59,118	36,910-56,386	137,569	68,139-81,301	59,780	21,109-40,459	83,999
Health Professions	X	50,742	X	44,210	X	X	2,981	83,412	X
Liberal Arts	14,555	13,688-19,668	13,692	30,906	60,440	53,902	3,326	35.548	X
Trade & Industrial	X	X	84,689	X	X	X	18,636-86,326	X	X
DISCOUNT RATE = 10 PERCENT									
Engineering & Architecture	15,541	X	30,410	X	27,907	X	20,874	X	26,641
Business & Management	18,075-36,453	15.367-22,969	18,090	15,141-21,711	44,709	26,493-30,405	13,898	5,940-13,281	23,355
Health Professions	X	18,877	X	16,265	X	X	-3,664	31,248	X
Liberal Arts	2,270	3,742-5,740	1,531	10,000	17,952	18,787	-5,956	10,084	X
Trade & Industrial	X	X	33,565	X	X	X	3,082-27,253	X	X
DISCOUNT RATE = 15 PERCENT									
Engineering & Architecture	7,470	X	14,703	X	11,843	X	6,332	X	3,355
Business & Management	7,223-15,273	7,504-10,796	6,193	7,493-10,241	17,436	12,368-13,854	1,715	1,002-4,380	6,349
Health Professions	X	8,430	X	7,098	X	X	-5,371	13,663	X
Liberal Arts	-1,045	488-1,343	-1,676	3,358	5,525	7,541	-7,355	2,060	X
Trade & Industrial	X	X	15,950	X	X	X	-1,605-8,805	X	X
DISCOUNT RATE = 20 PERCENT									
Engineering & Architecture	4,166	X	8,033	X	5,350	X	1,017	X	2,882
Business & Management	3,096-7,127	3,963-5,628	1,950	4,054-5,385	7,373	6,217-6,888	-2,109	-1,047 698	471
Health Professions	X	4,019	X	3,229	X	X	-5,596	6,082	X
Liberal Arts	-2,044	-844--408	2,581	680	1,047	2,915	-7,150	-1,131	X
Trade & Industrial	X	X	8,389	X	X	X	-3,235-1,833	X	X

[1] Ranges for present values are indicated where alternative assumptions as to the profile of graduate earnings produced significantly different results. There may be no corresponding ranges in Table 2.2 when both alternatives exhibited internal rates above 35.0 percent. Insufficient sample sizes are indicated with an "X". All figures are expressed in 1969 dollars.

- Of the 11 cohort pairs which vary only in terms of the co-op/non-co-op parameter, eight co-op cohorts have higher present values at a discount rate of 10 percent. In two of those comparisons in which non-co-op had a higher present value (male, 2-year, Engineering & Architecture and female, 2-year, Liberal Arts), one or both of the comparison cohorts have limited sample sizes; and virtually identical present values are indicated for both co-op and non-co-op female, 2-year Business & Management cohorts.
- Of the nine cohort pairs which vary with respect to sex, only three show that the male cohorts have the higher present value at a discount rate of 10 percent. These are all in Business & Management. In the four Liberal Arts cohort pairs, the female cohorts all exhibit higher present values. This indicates that a postsecondary Liberal Arts education is a more attractive educational option for a female than for a male, and vice versa for Business & Management.
- At a discount rate of 10 percent, of the 12 cohort pairs which vary by program length, 4-year programs exhibit higher present values than either 2- or 5-year programs except for non-co-op males and non-co-op, Business & Management females. From the limited comparisons available, a discount rate of 10 percent places the 5-year program results between the 2- and 4-year results in terms of present values.
- One very interesting comparison (and the major reason that 5-year programs were included), is that between co-op, 5-year, and non-co-op 4-year. Table 2.3 shows that, no matter what the rate of interest, the 5-year co-op investment is more profitable than the corresponding non-co-op, 4-year investment. This means that co-op participation is to be preferred as an investment option even though it may increase the total years of schooling from four to five.

Numerous other comparisons and evaluations could be made between cohort net benefit streams at alternative rates of discount. This procedure, however, is needlessly tedious. A quick indication of the relationships of the present value of two cohorts at all rates of discount can be obtained by calculating Fisher's Rate of Return Over Cost. At this rate of discount, both options (cohorts) have equal present values. Above this rate one has a higher point value whereas below the other is preferred. If no Fisher's Rate of Return Over Cost exists, then one alternative is always preferred to the other. Therefore, the next section will present the Fisher's Rate of Return Over Cost calculations, from which relative financial rewards can be quickly determined, and after which additional reference to the present values of Table 2.3 can be made to ascertain actual dollar reward differences, if desired.

3. Fisher's Rate of Return Over Cost

Selected cohort comparisons were made (with equation (4)) using Fisher's Rate of Return Over Cost by systematically varying certain cohort parameters. The most important of these are co-op/non-co-op status, sex, and discipline area, although program length is also considered on a selected basis. That is, each element in the tables below represents a cohort comparison in which only one cohort parameter is being varied. The parameter being varied is indicated in the table title. Therefore, it is not necessary to compare different table elements with each other as was the case with Present Values and Interval Rates of Return. Each element contains all the necessary information for that particular cohort comparison and reference to other table elements is not necessary.

a. Comparisons were made for the 11 cohort pairs that differed only in terms of co-op/non-co-op status. In addition, the two 5-year co-op programs in Engineering & Architecture and Business & Management were compared with the corresponding 4-year non-co-op programs. The results are presented in Table 2.4.

All five of the available comparisons for 4-year programs show that the cooperative education option is more profitable at all interest rates up to 35.0 percent (i.e., is Dominant). result remains the same regardless of which sex or discipline area is being considered. Co-op education is definitely more rewarding for 4-year programs. The same cannot be said for the 2-year program, however. Only two of the six available comparisons show the co-op program to be dominant, while two other comparisons indicate the inferiority of the co-op program. In all four cases, however, at least one of the cohorts used in the comparison was limited in sample size. The final two comparisons (for Business & Management cohorts) show mixed results. For the female cohorts, the presence of alternative streams for graduate earnings causes the results to be favorable to either co-op or non-co-op depending upon the choice of graduate earning stream. Male, Business & Management, and 2-year cohort comparisons indicate a range of co-op being preferred at all interest rates up to 35.0 percent to being preferred only above 10.0 percent interest rates depending, again, upon the choice of graduate earning stream adjustments.

TABLE 2.4: FISHER'S RATE OF RETURN OVER COST FOR COOPERATIVE EDUCATION RELATIVE TO NON-COOPERATIVE EDUCATION BY PROGRAM LENGTH, SEX, AND DISCIPLINE AREA[1/]

COHORT CHARACTERISTICS	2-YEAR		4-YEAR		5-YEAR[2/]
	MALE	FEMALE	MALE	FEMALE	MALE
Engineering & Architecture	I	X	D	X	D
Business & Management	(10.0),D	I,D	D	D	D
Health Professions	X	D	X	X	X
Liberal Arts	D	I	D	D	X

[1/] "D" indicates that the co-op option is preferred at all interest rates up to 35.0 percent (i.e., is Dominant). "I" indicates that co-op is not preferred at any interest rate up to 35.0 percent (i.e., is Inferior). "( )" indicates that the non-co-op option is preferred up to the specified interest rate, whereas a lack of parentheses indicates that co-op is preferred up to the indicated rate. Multiple cell results are due to alternative specifications of graduate net benefit streams where these alternatives changed the results. "X" indicates the absence of cohorts for comparison.

[2/] Five-year co-op programs were compared with 4-year non-co-op options of the same sex and discipline area parameters.

The reason for these mixed results is probably due to the vocational aspect of 2-year programs and the relatively short period of instruction during which co-op participation may alter benefits. In other words, the curricula differences between co-op and non-co-op 2-year programs are probably slight to begin with and the short program length does not allow what differences there may be to differentially influence the net benefit streams to any substantial degree. For example, 2-year non-co-op programs are often vocational in nature with appreciable actual or simulated "on-the-job" experience which closely resembles the configuration of a typical co-op program. Thus, there may be little actual difference between such non-co-op programs and co-op programs, and what little difference remaining has only 2 years to impact on the lifetime experience of the participant. For example, most males in the 2-year Engineering & Architecture cohort were probably in a drafting/mechanical drawing program which is highly vocationally oriented regardless at whether co-op participation is elected. The 2-year Liberal Arts programs, however, are usually designed to provide students with a maximum number of transferable credits to 4-year institutions. In this instance, co-op is apt to be exploratory rather than vocational, so that a different explanation must be sought for the apparent financial advantage to co-op participation by females.

One of the more interesting results from Table 2.4 is the comparison of 5-year co-op and 4-year non-co-op cohorts of the same sex and discipline area. This comparison demonstrates the financial viability of an individual participating in a co-op program rather than a non-co-op program even though it requires an additional year of school. Table 2.4 shows quite clearly that the added benefits which accrue to the co-op participant more than compensate for the added costs of an additional year of school at all interest rates up to 35.0 percent. This result is consistent with those described earlier with respect to present values.

In sum, Table 2.4 demonstrates that the differential in financial rewards between co-op and non-co-op programs increases with program length. While there were mixed results for 2-year programs, co-op education was consistently dominant over non-co-op at the 4-year level. This indicates that, over the longer time period, co-op/non-co-op curricula differences do affect the graduate net benefit streams in favor of co-op education. In fact, this differential becomes substantial enough to allow 5-year co-op programs to dominate 4-year non-co-op programs--more than covering the costs of the additional year. These results hold for all sex and discipline area parameters where results were available.

A possible explanation for the greater payoff to co-op in 4-year programs is the use of the co-op experience as a screening device for entry level jobs for 4-year college graduates, but not for 2-year graduates. If co-op experience is used by employers as a means of differentiating among applicants with otherwise equivalent 4-year college training, the better jobs are likely to go to the co-op graduates. This hypothesis is supported by data presented below in Section IV showing that employers often value co-op student employees more highly than they do regular employees performing similiar functions. Therefore, to the extent that co-op participation differentiates the college experience better in a 4-year program than in a 2-year program (see discussion above) and to the extent this participation is used by prospective employers to screen 4-year program graduates and not 2-year program graduates, the financial reward from co-op participation will be seen to increase with program length.

b. Comparisons were made between the nine cohort pairs which varied only in terms of sex. These comparisons were available for three of the five discipline areas under study because female cohort sizes were too small for Engineering & Architecture and Trade & Industrial. These results of the sex comparisons are presented in Table 2.5.

TABLE 2.5: FISHER'S RATE OF RETURN OVER COST FOR FEMALE RELATIVE TO MALE COHORTS BY PROGRAM LENGTH, COOPERATIVE/NON-COOPERATIVE STATUS, AND DISCIPLINE AREA[1]

COHORT CHARACTERISTICS	2-YEAR		4-YEAR	
	CO-OP	NON-CO-OP	CO-OP	NON-CO-OP
Business & Management	(.6),I	(6.2),(12.6)	(21.9),(24.3)	(10.5),(16.3)
Health Professions	X	X	X	D
Liberal Arts	D,(5.9)	D	(8.8)	D

[1] "D" indicates that the female cohort is preferred at all interest rates up to 35.0 percent (i.e., is Dominant). "I" indicates that the female cohort is not preferred at any interest rate up to 35.0 percent (i.e., is Inferior). "( ) indicates that the male cohort is more cost-effective up to the rate indicated, whereas a lack of parentheses indicates that the female cohort is preferred up to that rate. Multiple results are due to alternative specifications of graduate earnings where such alternatives changed the results. "X" indicates cohorts were unavailable for comparison.

Care should be taken in interpreting the results of Table 2.5. They do not indicate which courses of study males and females should follow. Rather, they reveal which sex achieves the higher level financial reward within a given discipline area. Decision rules governing the choice of discipline area for a particular sex cannot be derived from the results of Table 2.5, but should be left to the Fisher's Rate of Return Over Cost calculations, where only discipline area parameters vary (see Tables 2.6 and 2.7 below).

From Table 2.5, it appears that investments by females in the non-co-op Liberal Arts cohorts are more profitable than those for males at all levels of interest rates, while, for the co-op Liberal Arts cohorts, females generally appear to have more cost-effective investments at the higher rates of interest. Since Fisher's Rate is within the expected range of interest rates, no clear preference can be stated between male and female co-op returns in Liberal Arts. If sample size limitations were not a consideration, one would be tempted to conclude that equalized returns had been achieved in Liberal Arts between co-op males and females at the rate indicated (i.e., Fisher's Rate of Return Over Cost).

The only available sex comparison between Health Professions cohorts showed the investments by females to dominate those by males at all interest rates. This is not surprising, given the female character of the occupations included and the generally higher opportunity costs (foregone earnings) of males seeking training in these health occupations.

A very interesting situation exists for the Busi- & Management comparisons. As was the case for Liberal Arts, the non-co-op comparisons indicate no clear advantage to either males or females with a resulting presumption of market equilibrium (i.e., equal present values for both sexes). On the other hand, it is clear that males have higher net benefits from 4-year co-op Business & Management training (within the relevant range of interest rates). This suggests that the introduction of cooperative education programs in the Business & Management discipline area has altered the economic returns in favor of males--certainly in 4-year programs, and probably in 2-year programs.

c. Fisher's Rate of Return Over Cost calculations were also calculated for cohort comparisons between discipline areas. With these calculations, pairs of discipline areas can be ranked according to their profitability at differing rates of interest, and changes in rankings observed as sex, co-op/non-co-op, and program length parameters vary. Tables 2.6 and 2.7 present the results of these calculations for co-op and non-co-op programs, respectively.

The first thing to be noted is the sparsity of results for the co-op program alternative (Table 2.6) relative to the non-co-op program alternative (Table 2.7). While part of this may be due to fewer observations for co-op programs, the more

TABLE 2.6: FISHER'S RATE OF RETURN OVER COST FOR ALTERNATIVE COOPERATIVE EDUCATION DISCIPLINE AREAS BY PROGRAM LENGTH AND SEX 1/

COHORT CHARACTERISTICS		2-Year					4-Year					5-Year	
		E&A	B&M	HP	LA	T&I	E&A	B&M	HP	LA	T&I	E&A	B&M
MALE	Engineering & Architecture (E&A)	-	(14.2), (29.7)	X	D	X	-	1	X	D	X	-	(4.6)
	Business & Management (B&M)	14.2, 29.7	-	X	D	X	D	-	X	D	X	4.6	-
	Health Professions (HP)	X	X	X	X	X	X	X	X	X	X	X	X
	Liberal Arts (LA)	I	I	X	-	X	I	I	X	-	X	X	X
	Trade & Industrial (T&I)	X	X	X	X	X	X	X	X	X	X	X	X
FEMALE	Engineering & Architecture	X	X	X	X	X	X	X	X	X	X	X	X
	Business & Management	X	-	D, (20.6)	D	X	X	-	X	D	X	X	X
	Health Professions	X	I, 20.6	-	D	X	X	X	X	X	X	X	X
	Liberal Arts	X	I	I	-	X	X	I	X	-	X	X	X
	Trade & Industrial	X	X	X	X	X	X	X	X	X	X	X	X

NOTE 1: "D" indicates that the discipline area on the lefthand tab is Dominant over that listed on the top banner at all interest rates up to 35.0 percent. "I" indicates that the discipline area listed on the lefthand tab is Inferior at all interest rates up to 35.0 percent. "( )" indicates that the discipline area listed on the lefthand tab is inferior up to the specified interest rate. The lack of parentheses indicates that the discipline area listed on the lefthand tab is preferred at interest rates up to that indicated. Multiple cell results are due to alternative specifications of graduate net benefit streams where these alternatives changed the results. "X" indicates the absence of cohorts for comparison. "-" indicates comparison between identical cohorts.

TABLE 2.7: FISHER'S RATE OF RETURN OVER COST FOR ALTERNATIVE NON-COOPERATIVE EDUCATION DISCIPLINE AREAS BY PROGRAM LENGTH AND SEX1/

COHORT CHARACTERISTICS		2-Year					4-Year				
		E&A	B&M	HP	LA	T&I	E&A	B&M	HP	LA	T&I
MALE	Engineering & Architecture (E&A)	=	D	X	D	(24.2)	=	D	D	D	(26.5), D
	Business & Management (B&M)	I	=	X	D	I	I	=	D	D	D,I
	Health Professions (HP)	X	X	X	X	X	I	I	=	(5.2)	I
	Liberal Arts (LA)	I	I	X	=	I	I	I	5.2	=	I
	Trade & Industrial (T&I)	24.2	D	X	D	=	26.5, I	I,D	D	D	=
FEMALE	Engineering & Architecture	X	X	X	X	X	X	X	X	X	X
	Business & Management	X	=	(13.0), D	D	X	X	=	I	D, (19.4)	X
	Health Professions	X	13.0, I	=	D	X	X	D	=	D	X
	Liberal Arts	X	I	I	=	X	X	I, 19.4	I	=	X
	Trade & Industrial	X	X	X	X	X	X	X	X	X	X

NOTE 1: "D" indicates that the discipline area on the lefthand tab is Dominant over that listed on the top banner at all interest rates up to 35.0 percent. "I" indicates that the discipline area listed on the lefthand tab is Inferior at all interest rates up to 35.0 percent. "( )" indicates that the discipline area listed on the lefthand tab is inferior up to the specified interest rate. The lack of parentheses indicates that the discipline area listed on the lefthand tab is preferred at interest rates up to that indicated. Multiple cell results are due to alternative specifications of graduate net benefit streams where these alternatives changed the results. "X" indicates the absence of cohorts for comparison. "=" indicates comparison between identical cohorts.

important factor would seem to be program specialization by sex. That is, co-op cohorts of each sex tend to concentrate in selected discipline or program areas, and to a greater extent than those not participating in cooperative education. This also partially explains the sparsity of observations in Table 2.5, above.

Examination of the co-op program comparison of Table 2.6 indicates quite clearly that the choice of Liberal Arts is Inferior (i.e., never preferred at any discount rate below 35 percent) to that of any other program area. This result is invariant with respect to sex or program length. The only other results of interest in Table 2.6 concern the Business & Management program. In particular, Business & Management is always preferred to other discipline areas with a program length of 4 years, regardless of the sex of the student. For 2-year programs, however, the results with respect to Business & Management are mixed (i.e., the choice depends on the graduate earnings assumption chosen and the relevant market rate of interest). Finally, the 5-year Business & Management investment option for males was found to be less rewarding than Engineering & Architecture at all rates of interest above 4.6 percent. Obviously, Business & Management fared less well at the 5-year level than it did at either the 2-year or the 4-year level.

Turning to the non-co-op discipline area comparisons of Table 2.7 again demonstrates quite clearly the less preferred position of Liberal Arts as an investment choice. Since similar results were observed for co-op comparisons, it is clear that co-op participation has little to do with the ranking of Liberal Arts as an investment choice, and such a result is expected when comparing non-specific educational training (Liberal Arts) with specific training (other discipline areas).

Business & Management does not fare as well relative to other discipline areas for non-co-op participants as it did for co-op participants. In particular, Engineering & Architecture is preferred over Business & Management for both male 2-year and 4-year non-co-op options, and Business & Management declines in preference relative to 2-year female Health Professions. Clearly, participation in cooperative education benefits both males and females in Business & Management relative to other occupational choices.

Trade & Industrial proved to be preferred to both Engineering & Architecture and Business & Management as well as Liberal Arts for the 2-year, non-co-op male cohorts. This result is no doubt due to the fact that Trade & Industrial, being the most vocationally oriented discipline area, is the most productive within the short 2-year program span. Health Professions and Liberal Arts ranked fourth and last, respectively, for the opposite reason. It is also clear that Engineering & Architecture again dominates Business & Management. On the other hand, the position of the Trade & Industrial program for the 4-year non-co-op male is unclear due to multiple graduate earnings specifications.

Three points should be stressed in summary. First, the results clearly show the failure of Liberal Arts programs to be competitive in any comparison, regardless of any other parameter values. Second, Trade & Industrial is generally the most profitable non-co-op option for males; while for females it is clearly Health Professions for 4-year non-co-op programs and unclear between Health Professions and Business & Management for 2-year programs. Most significant, however, is the major impact cooperative education has on the financial rewards from Business & Management. This is reflected in the male 4-year comparisons where Business & Management dominates Engineering & Architecture under co-op, but the opposite holds for non-co-op. Reference to Table 2.3 will show that it is a major increase in the present value of the 4-year, male Business &

Management benefit stream under co-op (rather than a decline of the Engineering & Architecture stream) that is the cause for this switch. It can be concluded, therefore, either that co-op educational programs and techniques are more readily adaptable to Business & Management curricula than those for Engineering & Architecture, or that Business & Management co-op education is more effective in increasing the earnings capacity (productivity) of the program graduate.

4. Summary of Rate of Return Analysis

To this point in the analysis, a number of questions have been answered, so that it is worthwhile to summarize these answers and provide a basis for the analysis which follows. The detailed findings will not be repeated; rather the reader is referred to the individual sections above for this type of material. Certainly, it is clear from the data that college education is a worthwhile investment if one possesses a high school education. Only in the case of males enrolling in non-co-op Health Professions or Liberal Arts programs was there the slightest doubt as to the financial viability of such an educational investment.

Within the college investment opportunity set, it is equally clear that additional returns are to be gained by participating in a cooperative education program while attending college. This result is the clearest with respect to the 4-year co-op program, although the returns to the 5-year co-op program were large enough relative to a non-co-op 4-year program to encourage participation in the co-op program even though it may require an additional year of school.

In general, 4-year program lengths exhibited the highest returns regardless of co-op participation, sex, or discipline area; and females generally benefit more from a college education than do males, although this difference is not as clear when considering only co-op participants and does not exist (males benefit more) for Business & Management training. The discipline areas of Business Management and Engineering & Architecture are where the most gain can be received (observations on Trade & Industrial are too sparse to form a judgment) from a college education, although the differential gains tend to be reduced as the market rate of interest faced by the prospective college entrant increases.

Thus, it is clear that both males and females benefit from a college education, more in some discipline areas and lengths of program than others, but almost always more when participating in a co-op program. From the individual's point of view then, the remaining question to be answered is the extent to which these gains are a result of the enhanced graduate earnings as opposed to lowered costs of education. The next part of Section I will examine the graduate experience whereas the student experience will be the subject of Section II. Are the gains from co-op participation due to increased productivity and higher labor force participation and/or is co-op an effective financial aid mechanism? An answer will be sought to both parts of this question.

C. Additional Graduate Analysis

Additional analysis of the graduate experience is necessary for three reasons. First, the superior returns to cooperative education may be due, at least in part, to increased graduate earnings and/or labor force participation. Second, graduate earnings may be affected by variables which were not used in the rate of return analysis due to sample size constraints. Third, cooperative education is theorized to have an impact on the graduate experience which is not necessarily reflected in earnings differentials. This last impact must be assessed through analysis of graduate data which is more subjective in nature. Accordingly, Section C is divided into two parts. Part 1 will consider variations in graduate earnings which may have been the result of variables both considered and not considered in the rate of return analysis. Part 2 will present the analysis of the non-pecuniary experience of graduates and consider the impact of cooperative education upon variables which reflect differences in job satisfaction, frequency of unemployment, fulfillment of career plans, and career advancement.

1. Additional Analysis of Graduate Earnings

As indicated above, this subsection will deal with those factors which may have impacted on the graduate earnings as calculated. This includes both those variables which directly or indirectly were included in the rate of return analysis above, and those factors which were not included because of cohort size limitations. Each set of factors will be analyzed in turn.

In the analysis of graduate earnings, a unique measure of these earnings is employed. The earnings measure is a composite of the earnings experiences for the first three years following graduation. For each cohort or stratum, the monthly earnings (converted to 1969 dollars) for each month throughout the 36-month period were calculated from the questionnaire response (see the Technical Notes to Chapter 2 for a detailed description of the extrapolation and interpolation algorithms used), and the number of observations upon which each monthly figure was based were likewise recorded. Periods of unemployment were included as valid observations with zero earnings.

The mean three-year earnings figure for the cohort or stratum under consideration was then calculated as the mean of the individual monthly earnings, weighted by the number of observations for the month as a proportion of all monthly observations for all 36 months. This is exactly the same procedure graduate earnings in the rate of return analysis from which lifetime income profiles were generated.

The choice of a three-year period not only minimizes the frequency of non-observations, but also provides a balance between graduates of 1970 and graduates of 1973. Both graduating classes had at least three years of post-graduate experience[1] at the time of the survey--1976. Therefore, the three-year earnings figures are for both graduating classes combined, unless otherwise indicated. The 1970 graduating class includes anyone who graduated in any month in calendar year 1970, while the 1973 graduating class includes all those who graduated during any month during calendar year 1973. The months of experience for each individual were measured from the actual month of graduation, and conversion of the earnings of each month of the 36 to 1969 dollars (June of the year = 100) was based on that reference point, so that the two graduating classes could be easily merged.

a. Graduate Earnings by Rate of Return Variables

The rate of return analysis was limited to sex, length of program, discipline area, and co-op status. In addition, the calculations represented the net results of both the student and the lifetime earnings experience combined. It is worthwhile to try to attribute the rate of return findings to one or both of these experiences because policy tools are much more readily available for the student experience than for the graduate experience. This subsection will examine graduate earnings with respect to the selected variables listed above, whereas Section II will address the student experience.

Table 2.8 was prepared to show the mean graduate earnings for the first three years after graduation by the rate of return cohort identifiers for the same sample of graduates that was used in the rate of return analysis. In terms of co-op/non-co-op comparisons, tests indicated that the mean earnings of co-op graduates were significantly higher (at a 95%

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[1] Of course, those who attended graduate school and were not able to work full time were eliminated from the sample for these calculations.

TABLE 2.8: MEAN FIRST THREE-YEAR GRADUATE EARNINGS BY SEX, LENGTH OF PROGRAM, DISCIPLINE AREA, AND CO-OP STATUS 1/

GRADUATE CHARACTERISTICS	CO-OP		NON-CO-OP	
	Number	Mean	Number	Mean
TOTAL	442	23811	965	16942
Sex: Male	363	26320	579	20088
Female	79	12285	386	12223
Program Length: 2-Year	95	11869	358	11179
4-Year	158	25252	606	20329
5-Year	189	28609	0	-
Discipline Area:				
Engineering & Architecture	238	28751	132	23652
Business & Management	151	19676	331	16832
Health Professions	8	10683	91	15886
Liberal Arts	41	13436	374	14764
Trade & Industrial	4	18584	37	18601

1/ Mean first three-year earnings are in 1969 dollars.

confidence level) than those for non-co-op graduates when considering all graduates, male graduates, and those graduates of Engineering & Architecture programs. No significant differences were found between co-op and non-co-op graduates when considering only females, any of the three program lengths, or discipline areas other than Engineering & Architecture. Such findings are not surprising relative to those of the rate of return analysis because: (1) the student experience has not yet been considered, and (2) in most instances earnings differences are observed which would explain (or be consistent with) the rate of return calculation, even though such differences may not be significant statistically.[1] Certainly, these figures are not inconsistent with the rate of return findings demonstrating as they do the superior earnings by-in-large attributable to co-op participation.

Examination of the mean three-year earnings figures of Table 2.8 within each co-op status also reveals other interesting relationships. In both co-op and non-co-op, male earnings are significantly greater than the corresponding female earnings. At the same time, both co-op and non-co-op earnings are significantly higher for 4-year than 2-year programs. While co-op 5-year earnings are significantly higher than those for 2-year programs and are absolutely higher than those for 4-year programs, they are not significantly higher than those for 4-year programs.

Finally, all of the discipline areas for co-op earnings except Trade & Industrial are either significantly higher or lower than the mean earnings for all co-op graduates, whereas, in the case of non-co-op graduates, only the earnings of Engineering & Architecture are significantly different from the non-co-op overall mean. In these discipline area comparisons, it is interesting that participation in co-op tends to create larger earnings differentials among the discipline areas, in addition to increasing the overall mean. This is probably due to the fact that co-op education is better suited in terms of initial earnings to some discipline areas than others (e.g., Engineering & Architecture vs. Liberal Arts). This is consistent with the rate of return findings, as are the male/female and length of program earnings differentials. Certainly, to a substantial degree, the earnings figures account for the observed rate of return differences. The extent to which the student experience also contributes to these findings must await the analysis of Section II, below.

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[1] Note that differences in the rates of return were never identified as statistically significant or not, because a test does not exist for such a determination. Tests are available, however, to measure the significance of earnings differences.

Before turning to the analysis of graduate earnings by variables which by-in-large were not used in the rate of return analysis due to cohort size limitations, the impact of hours worked per week and the participation rates of graduates should be examined. While these factors were not used to define cohorts, they nevertheless may have had substantial impacts on the graduate earnings as reported and calculated. Accordingly, mean hours worked per week and the proportion of months worked in the three-year post-graduation period were tabulated by discipline area, and are presented in Table 2.9. Three results from this table are worth noting:

- There were no significant differences in mean hours of work among the discipline areas.
- Engineering & Architecture had the highest labor force participation rate; significantly different (at the 95 percent confidence level) from the total sample mean.
- Liberal Arts by far had the lowest labor force participation rate of any of the discipline areas.

Finally, Table 2.9 was stratified by program length and the sex and race of the graduates. While participation appeared to be positively related to program length, the association was not statistically significant at the 95 percent confidence level. Absolutely no association was apparent between mean hours of work or participation rates and race or sex of the graduate. Tabulations were also conducted on the number of working hours and participation rates by the previous co-op participation status of the individual, as well as whether the graduate had had similar work experience, in order to determine if co-op participation or previous experience rather than market conditions in each of the discipline areas could explain the observed pattern of labor force participation. Neither of these circumstances were found to have a significant impact at a

TABLE 2.9: MEAN HOURS OF WORK PER WEEK AND MEAN LABOR FORCE PARTICIPATION RATES FOR THE FIRST THREE YEARS FOLLOWING GRADUATION BY DISCIPLINE AREA

DISCIPLINE AREA	MEAN HOURS OF WORK		LABOR FORCE PARTICIPATION RATE	
	Number	Mean	Number	Mean
All Discipline Areas	1403	42.8	1407	.822
Engineering & Architecture	370	42.2	370	.927
Business & Management	481	42.3	482	.830 -
Health Professions	99	42.3	99	.798
Liberal Arts	412	44.0	415	.720
Trade & Industrial	41	44.7	41	.884

95 percent level of confidence (although co-op participation was always slightly higher than non-co-op participation), so that participation and hours of work cannot be identified as significant factors behind the observed co-op/non-co-op earnings and rate of return differences.

In sum, while it appears that the number of working hours is essentially the same for anyone with a job, the chances of having a job vary significantly. These results strongly support those found in the rate of return analysis. The discipline area with the highest and lowest returns reflect the highest and lowest labor force participation rates, respectively. In addition, of course, these findings explain to a great extent the earnings presented in Table 2.8, above. Note that there is a great deal of correspondence between the participation rates and the graduate earnings.

Some have concluded that this finding for Liberal Arts may be misleading in that the Liberal Arts graduates are dichotomized. That is, it is alleged that such graduates form two distinct groups: those who enter employment in the public sector and thereby earn reduced levels of income, and those who enter the private sector and thereby earn very high levels of income. To test this hypothesis, mean first three-year earnings were computed for each group and presented on Table 2.10. None of the relationships on Table 2.10 are significantly different from any other at a 95 percent level of confidence (using t-tests). Then the data acquired during this study fail to confirm this hypothesis.

TABLE 2.10: MEAN FIRST THREE-YEAR EARNINGS FOR LIBERAL ARTS GRADUATES BY SECTOR OF EMPLOYMENT, SEX, AND CO-OP STATUS[1]

		PUBLIC		PRIVATE	
CHARACTERISTICS		Number	Mean	Number	Mean
TOTAL		336	11863	221	11518
Co-op:	Male	14	14467	11	14099
	Female	17	8907	13	7888
Non-co-op:	Male	169	14789	135	12795
	Female	166	15455	62	9041

[1] Mean first three-year earnings are in 1969 dollars; "Private" includes only those who remained in the private sector for all of the first three-years after graduation; this table is based on the Earnings Sample, see below.

b. Graduate Earnings by Non-Rate of Return Variables

There are many other potential factors influencing the graduate earnings experience. These factors include the area unemployment rate, region, race, the presence of IV-D funding (for co-op institutions), and the graduation date. Before exploring the influence of these variables, an examination was made of whether to include in the sample base some of those observations excluded from the rate of return analysis. A total of four samples of data are defined.

- In order to analyze graduate earnings, the response to earnings questions in the graduate questionnaire must have been complete and must have exhibited internal consistency. As described in the Technical Notes to Chapter 2, questions 24 and 25 in the graduate questionnaire were manipulated so that an earnings and employment history could be constructed for each respondent. Proper and consistent answers to these questions permitted the creation of monthly earnings data which spanned a minimum of 36 months.
- The age at graduation for each individual had to be within reasonable limits depending upon program length; 18-21 years for 2-year programs, 20-23 years for 4-year programs, and 21-23 years for 5-year programs. Responses not within these age limits were eliminated from the rate of return sample.
- A portion of individuals indicated that they did not work after graduation because they attended full-time graduate programs. These individuals were excluded from this sample. Persons who attended part-time graduate programs which did not interfere with employment were not excluded.
- A portion of data was received from graduates of schools for which no corresponding student data were available. The rate of return analysis required cost and benefit histories for individuals which were consistent by school. (This requirement is described in the Methodology section of this chapter under the heading "Cohort Characteristics Selection.") Thus, any graduate data from these schools were eliminated from the rate of return sample.

Any graduate data record which met these four main criteria was included in the Rate of Return Sample.[1]

The second sample was defined by the following criterion:

- Elimination from the Rate of Return Sample because graduation ages were above the program length-specific limits.

These individuals were deemed to have had previous experience and were defined as the Previous Experience Sample.

The third sample was defined by the following criteria:

- Elimination from the Rate of Return Sample because of participation in a full-time graduate program after graduation from an undergraduate program; and
- Non-inclusion in the Previous Experience Sample.

These individuals were defined as the Graduate Sample.

The fourth, and final, sample is defined according to the following criteria:

- Elimination from the Rate of Return Sample because of attendance at a school where no corresponding student data were available, and
- Non-inclusion in the Previous Experience or Graduate Samples.

This sample will be known as the Missing Student Data Sample.

Of course, the Rate of Return Sample could be used exclusively in this section and strict comparability with the previous rate of return analysis would be maintained. But, it would be of great benefit if some or all of these four samples could be merged. The number of observations would be increased, and substantial improvement in the accuracy of the results and the validity of statistical tests realized thereby. If it could be shown that the Previous Experience, Graduate, and Missing Student Data Samples were statistically equivalent to the Rate of Return Sample with respect to the variables to be analyzed, the necessity of performing separate statistical procedures upon these samples would also be eliminated. On the other hand, if the earnings figures from one or more of the samples are consistently different from the Rate of Return Sample, a statement should be made regarding the statistical significance of these differences and the variable(s) that produced them.

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[1] A small number of individuals (totaling about 100) failed assorted other criteria and may be broadly defined as "bad data." These individuals were eliminated from all analyses.

Accordingly, mean first three-year earnings were tabulated by unemployment level, region, race, and date of graduation for each of the four samples. The results of these tabulations are presented in Table 2.11. For each variable in this table, t-tests were performed to compare the values from the Graduate, Previous Experience, and Missing School Data Samples to the corresponding values in the Rate of Return Sample. Several results of these comparisons are worth noting.

- The Graduate Sample was not statistically different from the Rate of Return Sample (at the 95 percent confidence level) regardless of the variable breakout.
- The missing Student Data Sample was statistically different (at the 95 percent confidence level) from the Rate of Return Sample only in the comparison of White earnings.
- The total earnings figure for the Graduate Sample and the Missing Student Data Sample were lower and higher than the Rate of Return Sample, respectively, but not significantly so. Therefore, the union of these two samples will result in mean values which reduce even further the observed (but not significant) differences from the Rate of Return Sample.

TABLE 2.11: MEAN FIRST THREE-YEAR SAMPLE-SPECIFIC EARNINGS BY UNEMPLOYMENT LEVEL, REGION, RACE, AND GRADUATION DATE[1/]

CHARACTERISTICS		RATE OF RETURN SAMPLE		GRADUATE SAMPLE		PREVIOUS EXPERIENCE SAMPLE		MISSING STUDENT DATA SAMPLE	
		Number	Mean	Number	Mean	Number	Mean	Number	Mean
Total Sample		1407	19100	311	16019	417	32604	145	23751
Unemployment:	High	640	19486	144	15313	204	31256	74	22388
	Low	767	18778	167	16629	213	33894	71	25171
Region:	East	1309	19552	293	16507	339	35743	145	23751
	West	98	13024	18	8068	78	18960	0	
Race:	White	1292	18614	296	16206	378	34105	139	23716
	Non-White	105	25657	11	12484	36	18315	5	22082
Graduation Date:	1970	427	22060	123	17738	78	26041	58	23527
	1973	860	16840	158	15148	240	18991	83	24534

[1/] Mean first three-year earnings in 1969 dollars.

- The Previous Experience Sample had consistently and significantly higher earnings than the Rate of Return Sample, indicating that these individuals have positive earnings due to previous experience which are not matched by those in the Rate of Return Sample.
- Significant within sample differences (at a 95 percent level of confidence) were observed only twice. Within both the Rate of Return and Previous Experience Samples, graduation date is shown to have a significant impact on earnings. This is probably due to the differential in the general state of the economy between these two years. Separate tabulations indicated that the distribution of individuals by graduation date did not change within the variables of unemployment, region, or race, however. Thus, the analysis of the means of these other variables was not biased by the differences between graduation dates. (I.e.,the effect of the first order interaction of graduation date and the other variables is nil.)

From the earnings figure in Table 2.11, it appears that both the Graduate Sample and the Missing Student Data Sample may be merged with the Rate of Return Sample without affecting the statistical analysis. Equally clear is the fact that the Previous Experience Sample exhibits properties which are very different from the Rate of Return Sample. Thus, further analysis will continue to separately identify the Previous Experience Sample. To verify the fact that the merged sample is statistically equal to the Rate of Return Sample, comparisons were made between earnings figures tabulated by unemployment level, region, and race. The results of these tabulations are in Table 2.12. (In this table, and all which follow, the combined Rate of Return, Graduate, and Missing Student Data Samples will be known as the Earnings Sample.) In no instance were there any statistical differences between corresponding values in the Rate of Return Sample and the larger Earnings Sample, regardless of the sample stratification.[1/] This does not mean to say that no differences were observed within each sample, rather that observed differences were similarly reflected within both samples under question. From these calculations, it appears that the larger Earnings Sample may be used for the remaining analysis in place of the Rate of Return Sample without sacrificing consistency with the previous rate of return analysis.

It should be pointed out that the observations in these tables do not always sum to the total sample size. For instance, in Table 2.12, Whites in the Earning Sample (1727) and Non-Whites (121) do not sum to the total sample (1863). In this case, 15 individuals did not report their race, and were thus eliminated from calculations which rely on this variable. This does

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[1/] Similar comparisons were made for Tables 2.8 and 2.9, above, with no significant difference indicated between the Rate of Return Sample and the Earnings Sample.

TABLE 2.12: MEAN FIRST THREE-YEAR EARNINGS FOR SAMPLE CHARACTERISTICS BY AREA UNEMPLOYMENT, REGION, AND RACE[1]

CHARACTERISTICS		RATE OF RETURN SAMPLE		EARNINGS SAMPLE	
		Number	Mean	Number	Mean
Total Sample		1407	19100	1863	18944
Unemployment:	High	640	19486	(858	19036
	Low	767	18778	(1005	18871
Region:	East	1309	19552	1747	19388
	West	98	13024	116	12255
Race:	White	1292	18614	1727	18611
	Non-White	105	25657	121	24312

[1] Mean first three-year earnings in 1969 dollars.

not mean that the records for these 15 individuals will never be used; non-use will only occur when the missing data are required for a particular calculation. On this basis, the number of observations may vary for each calculation which takes place.

To determine the differential effects that unemployment level, region, race, and IV-D funding might have upon co-op and non-co-op graduate earnings, the Earnings Sample and the Pre-Experience Sample were stratified by these variables. The results of these tabulations are presented in Table 2.13.

Significant differences (at a 95 percent level of confidence) were found in earnings between total samples, but this difference between columns was not always maintained, however, as the respective samples were further stratified. For example, while previous experience significantly influenced the graduate earnings

TABLE 2.13: MEAN FIRST THREE-YEAR EARNINGS FOR SAMPLE CHARACTERISTIC BY AREA UNEMPLOYMENT, REGION, RACE, AND IV-D FUNDING[1/]

CHARACTERISTICS			EARNINGS SAMPLE		PREVIOUS EXPERIENCE SAMPLE	
			Number	Mean	Number	Mean
TOTAL	Total Sample		1863	18944	417	32604
	Area Unemployment:	High	858	19036	204	31256
		Low	1005	18871	213	33894
	Region:	East	1747	19388	339	35743
		West	116	12255	78	18960
	Race:	White	1727	18611	378	34105
		Non-White	121	24312	36	18315
CO-OP	Total Co-op		611	23470	77	25510
	Area Unemployment:	High	302	23393	34	31411
		Low	309	23546	43	20844
	Region:	East	571	24367	59	26943
		West	40	10665	18	20813
	Race:	White	570	23876	64	26824
		Non-White	36	18570	12	19503
	IV-D Funding:	Yes	299	22249	51	22999
		No	312	24640	26	30435
NON-CO-OP	Total Non-Co-op		1252	16741	340	34210
	Area Unemployment:	High	556	16669	170	31225
		Low	696	16797	170	37196
	Region:	East	1176	16975	280	37597
		West	76	13091	60	18404
	Race:	White	1157	16022	314	35590
		Non-White	85	26743	24	17720

[1/] Mean first three-year earnings in 1969 dollars.

of non-co-op participants, it had no impact on the earnings of graduates from co-op programs. At the same time, it was found that total co-op and non-co-op earnings were significantly different only within the Earnings Sample. (Small sample sizes produced this result for the Previous Experience Sample in spite of the apparent differences observed on Table 2.13.) One explanation is that the influence of previous experience overrides the influence that co-op participation may have on graduate earnings, and *vice versa*. Either previous experience or co-op participation may be used by employers as an information or employment screening device, but the presence of both attributes does not provide additional meaningful information to the employer (nor additional earnings to the employee).

Race was not found to be a significant factor in determining earnings within either sample, whether co-op or non-co-op. For the Earnings Sample, it can be seen that White and non-White mean earnings were not particularly close. While earnings appear to vary even more by race for the Previous Experience Sample, small sample sizes and large standard deviations again rendered these differences insignificant at the 95 percent confidence level. By examining the separate and combined effects of co-op participation and previous experience on Whites and non-Whites independently, some very interesting results are obtained: the pattern described above for the total samples holds only for Whites. That is, neither previous experience differences nor co-op participation differences produced significantly different mean graduate earnings for non-Whites. On the other hand, previous experience was found to have an impact on earnings for White non-co-op graduates, and the presence of co-op education was a significant impetus to White earnings, but only within the Earnings Sample, so that is appears that previous experience *or* co-op education is of great benefit to White graduates.

Thus, for Whites, as was the case for the combined races, co-op education and previous experience constitute distinguishing characteristics to the employer, but the benefits are not additive. Previous experience is not of value for co-op students and co-op education appears to be of significant value only for those students who have no previous experience.

The question remains as to why similar differences were not found for non-Whites. One important factor that must be kept in mind is that non-White sample sizes were never very large regardless of co-op or previous experience status, so that extreme care must be exercised in interpreting the non-White findings and the resulting White/non-White comparisons. While the data indicate that neither co-op status nor previous experience was a relevant factor in non-White earning potential, they also suggest that non-Whites are paid salaries above those for Whites in the non-co-op, no previous experience category. This may be taken to indicate that, because of Affirmative Action requirements, an earnings premium is paid to non-Whites that is unaffected by the presence of previous experience or co-op training.

Examination of Table 2.13 with respect to the unemployment level indicates that, while no significant differences (at the 95 percent confidence level) are observed within each sample between high unemployment and low unemployment comparison (regardless of co-op status), consistent inter-sample differences are maintained regardless of co-op status or level of unemployment, with one exception. Previous experience is not associated with higher mean graduate earnings in the case of co-op participants in low unemployment areas. This is, no doubt, due to the fact that in a tight labor market situation (low unemployment), the worker with previous co-op participation can command a salary as high as that received by a worker with both previous experience and co-op participation. Thus, in a tight labor market the co-op participation attribute seems to override the previous experience attribute. In high unemployment areas, however, the possession of previous experience commands a premium in earnings compared to no experience, with or without previous co-op participation. This means that the employers place a higher premium on work experience than co-op participation when the supply of labor is large.

The impact of IV-D funding on the earnings of graduates from co-op programs can be examined from Table 2.13. Earnings were calculated based upon whether the graduate had previous experience and whether the co-op program attended received IV-D funding. It was found that the presence of IV-D funding does not have a significant impact on the earnings of the program graduates whether the graduates had previous experience or not. It appears that whatever benefits result from IV-D funding accrue to the school involved, rather than to the individual student during his years of graduate earnings, except to the extent that the IV-D funding made possible the co-op participation.

Finally, Table 2.13 provides an opportunity to examine differences in earnings associated with regions of the country. Originally, cross-tabulations and earnings distributions were calculated using four regional areas--Northeast, North-Central, South, and West. But, since no earnings differences whatever were observed among the first three regions, they were collapsed into a single East region to facilitate comparison with observations on the West region. Examination of Table 2.13 reveals that the East always has significantly higher mean graduate earnings associated with it than does the corresponding figure for the West. In addition, examination of earnings figures for the total samples indicates that previous experience is associated with significant impact on such earnings in the West. Further, when considering previous experience and co-op participation, it was found that significant differences between East and West earnings are present if previous experience is assumed or if co-op participation is assumed, but not if both are assumed.

The East-West differential observed for both samples cannot be explained by race because no White-Non-White differences were previously observed and, as supporting evidence, no North-South differential was previously observed at the 95 percent confidence level. As a result, we must look to other factors to explain the series of East-West differences found. One potential factor is different distributions of graduates among the high and low earning disciplines.

From Table 2.8 above, it is clear that Liberal Arts and Health Professions have generally lower earnings streams associated with them than do Engineering & Architecture or Business & Management, for example. At the same time, Table 2.14 clearly shows that in each region--previous experience--co-op participation combination has its own distribution of observations by discipline area. For example, proportionally more than three times as many graduates of Engineering & Architecture were trained in the East than in the West. Since this discipline area reflects a very substantial proportion of the total population and is one of the higher earnings disciplines, it may be concluded that this is the cause of the regional disparity in earnings. Additionally, this disparity is exacerbated by the fact that the lower earning discipline areas (Liberal Arts and Health Professions) constitute much higher percentages of the student population in the Western sample.

Finally, reference to Table 2.14 will explain the East-West differences as both previous experience and co-op participation are introduced into the comparisons. The differential in the percentages of Engineering & Architecture graduates by region is significantly different for co-op graduates in the Earnings Sample, and non-co-op graduates in the Previous Experience Sample, but there is no significant difference in the percentage of Engineering & Architecture graduates by region for the co-op graduates in the Previous Experience Sample or for the non-co-op graduates in the Earnings Sample.

2. Analysis of Other Graduate Experience

Co-op participation is hypothesized to have an effect on the non-pecuniary experience of the college graduate. Accordingly, analyses were conducted to identify the effects of the cooperative education experience on job satisfaction, occurrence of unemployment, fulfillment of career plans, and rate of career advancement from the point of view of the recent graduate.

a. Level of Job Satisfaction

Each graduate was questioned regarding the level of satisfaction associated with the current job (i.e., the job held at

TABLE 2:14: PERCENT OF GRADUATES WITHIN EACH DISCIPLINE AREA BY SAMPLE, CO-OP STATUS, AND REGION[1]

CHARACTERISTICS			SAMPLE SIZE	ENGINEERING & ARCHITECTURE		BUSINESS & MANAGEMENT		HEALTH PROFESSIONS		LIBERAL ARTS		Trade & Industrial	
				Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total Sample		East West	2110 189	645 19	30.6 10.1	739 71	35.0 37.6	143 23	6.8 12.2	524 62	24.8 32.8	59 14	2.8 7.4
EARNINGS SAMPLE	Co-op	East West	560 37	355 3	63.4 8.1	154 20	27.5 54.1	9 1	1.6 2.7	36 12	6.4 32.4	6 1	1.1 2.7
	Non-Co-op	East West	1139 69	199 11	17.5 15.9	387 13	34.0 18.8	93 8	8.2 11.6	423 28	37.1 40.6	37 9	3.2 13.0
PREVIOUS EXPERIENCE SAMPLE	Co-op	East West	57 18	18 0	31.6 0.0	30 10	52.6 55.6	4 1	7.0 5.6	4 6	7.0 33.3	1 1	1.8 5.6
	Non-Co-op	East West	271 55	58 3	21.4 5.5	122 24	45.0 43.6	26 12	9.6 21.8	50 13	18.5 23.6	15 3	5.5 5.5

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[1] Percentages are for rows.

the time of the survey, which, in some cases, may be the first job). Responses ranged from highly satisfied to dissatisfied. Table 2.15 presents these responses by sample and co-op status. Within each sample, no significant differences (at a 95 percent confidence level) were observed between the response patterns of co-op and non-co-op graduates. By the same token, even though the non-co-op graduates from the Earnings Sample exhibit the lowest percentage of highly satisfied, and the non-co-op graduates from the Previous Experience Sample exhibit the highest percentage of highly satisfied, these differences were not significant at the 95 percent confidence level. Thus, while at least 83.2 percent of all respondents are satisfied with their current job, there are no significant differences in the percentage response rates as either co-op status or sample selection varied.

TABLE 2.15: PERCENT SATISFIED WITH CURRENT JOB BY SAMPLE CHARACTERISTICS AND CO-OP PARTICIPATION[1]

GRADUATE GROUPS		HIGHLY SATISFIED		SOMEWHAT SATISFIED		SOMEWHAT DISSATISFIED		DISSATISFIED	
		Number	Mean	Number	Mean	Number	Mean	Number	Mean
Earnings Sample	Co-op	339	50.9	254	38.1	54	8.1	19	2.9
	Non-co-op	613	45.8	501	37.4	164	12.3	59	4.4
Previous Experience Sample	Co-op	60	50.4	43	36.1	15	12.6	1	.8
	Non-co-op	242	54.6	154	34.8	30	6.8	17	3.8

[1] Percents are for rows; current job means job held at the time of the survey -1976.

Further breakdowns were conducted on these data to determine if any other variables (including some of those used to determine the rate of return cohorts), might have a significant impact on job satisfaction. As can be seen from Table 2.16, no significant difference (at a 95% level of confidence) is exhibited in the responses according to a Chi Square test as the year of graduation, sex, race, grade point average, or previous experience changed. The pattern is the same for both co-op and non-co-op educational backgrounds. Additional tabulations were also run by length of program and discipline area, but no significant differences were observed among the percent satisfied.

TABLE 2.16: PERCENT SATISFIED WITH CURRENT JOB BY SAMPLE AND GRADUATE CHARACTERISTICS AND CO-OP PARTICIPATION[1]

GRADUATE CHARACTERISTICS		CO-OP		NON-CO-OP	
		FREQUENCY	PERCENT SATISFIED	FREQUENCY	PERCENT SATISFIED
Sample:	Earnings	593	89.0	1114	83.2
	Previous Experience	103	86.5	396	89.4
Sex:	Male	596	88.9	1080	85.1
	Female	128	88.3	490	94.0
Race:	White	661	89.4	1436	85.1
	Non-White	56	83.6	117	81.3
GPA:	Above Mean	492	90.0	900	85.7
	Below Mean	233	86.6	671	83.8
Graduation Year	1970 Grad.	212	88.7	461	87.9
	1973 Grad.	416	88.3	905	83.5

[1] Current job means job held at time of survey - 1976.

A series of job related questions were asked of graduates in order to indirectly measure the levels of job satisfaction and responsibility. Table 2.17 presents the responses of both co-op and non-co-op graduates to each of the 11 questions. In four of the eleven questions the distribution of responses were significantly different between co-op and non-co-op graduates. In three of the four, the measure indicates that the co-op graduate receives more job responsibility in terms of job difficulty, number of job assignments, and solicitation of opinion by the boss. In only one instance was the response pattern significantly indicative

TABLE 2.17: PERCENT RESPONSES TO INDIRECT MEASURES OF JOB SATISFACTION AND RESPONSIBILITY BY CO-OP STATUS OF GRADUATES[1]

JOB-RELATED QUESTIONS [2]	CO-OP			NON-CO-OP		
	Always	Sometimes	Never	Always	Sometimes	Never
Do you decide how things are done?	28.0	69.1	2.9	24.8	69.7	5.5
Are you doing a more difficult job now than when hired?*	61.7	32.1	6.2	45.8	42.0	12.1
Does your boss often ask your opinion about work?*	39.6	54.6	5.7	28.8	59.5	11.7
Can you do your job without thinking?	3.2	30.3	66.6	5.1	31.0	64.0
Do you learn something new each day?	43.3	52.5	4.2	39.8	53.9	6.2
Are you interested enough in your job to learn things after work?	26.7	60.7	12.7	24.5	59.1	16.4
Does your boss tell you when you do a good job?	22.9	65.8	11.2	21.2	65.7	13.1
Do you do things off the job with the people you work with?	11.0	74.0	15.0	11.1	73.3	15.7
Do you get paid less than other workers who do the same job?	8.2	45.0	46.8	10.8	38.1	51.2
Do they have to find a replacement for you when you are absent?*	22.4	41.0	36.4	31.7	33.9	34.4
Have you had many different assignments on this job?*	53.6	40.5	5.9	41.6	48.3	10.1

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[1] All figures in the table are percentages. This table uses the Earnings Sample only.

[2] "*" denotes significant co-op versus non-co-op differences for the response patterns at the 95 percent confidence level according to Chi Square tests.

of less responsibility for the co-op graduate, and this was in response to whether a replacement had to be found in the employee's absence. A replacement had to be found "always" more frequently for the non-co-op graduate. Interestingly, none of the indirect measures of job satisfaction indicate significant co-op/non-co-op differences which is consistent with the finding from the direct measures in Table 2.16. Thus, all four significant findings relate to job responsibility rather than job satisfaction, and generally support the earlier findings that co-op graduates receive high pay relative to non-co-op graduates.

The questions on Table 2.17 were also tabulated to compare co-op/non-co-op responses by sex, race, program length, and discipline area. These tabulations are presented in Table 2.18 Note that the first column of this table repeats the information described in Table 2.17. That is, only four questions exhibited co-op/non-co-op difference at a 95 percent level of confidence, and only one of these was favorable to the non-co-op responses. It is primarily these same four questions that continue to display significant co-op/non-co-op differences when stratified by other characteristics. These other strata where significant differences are greatly found include White, male, and 4-year program length.

It is interesting that by-and-large the discipline and strata do not indicate significant co-op/non-co-op differences. The only significant differences are for three questions in the Business & Management discipline area, and one question each for Engineering & Architectural and Health Professions. Finally, it is meaningful that co-op/non-co-op differences are found for females when asked whether praise is received for a job well done, for Whites concerning getting paid less than other workers, and for Business & Management graduates interested in learning things after work. All of those responses favor co-op graduates, indicating that they either get paid more, are more willing to learn after work, and receive some praise for a job well done.

TABLE 2.18: SIGNIFICANCE OF INDIRECT MEASURES OF JOB SATISFACTION AND RESPONSIBILITY BY CO-OP STATUS BY SEX, RACE, PROGRAM LENGTH, AND DISCIPLINE AREA[1/]

	Total	Male	Female	White	Non-White	3-year	4-Year	Business & Management	Engineering & Architecture	Health Professions	Liberal Arts	Trades & Industrial
Do you decide how things are done?												
Are you doing a more difficult job now than when hired?	*	*	*	*			*	*		*		
Does your boss often ask your opinion about work?	*	*		*		*			*			
Can you do your job without thinking?												
Do you learn something new each day?												
Are you interested enough in your job to learn things after work?								*				
Does your boss tell you when you do a good job?			*									
Do you do things off the job with the people you work with?												
Do you get paid less than other workers who do the same job?				*								
Do they have to find a replacement for you when you are absent?	(*)	(*)		(*)			(*)					
Have you had many different assignments on this job?	*	*		*			*	*				

[1/] This table uses the Earnings Sample only and "*" denotes significant co-op/non-co-op response differences at a 95 percent confidence level. All significant findings indicate more frequent positive responses for co-op graduates except those in parentheses.

b. Frequency and Duration of Unemployment

It is theorized that co-op graduates, because of their stronger contacts with the labor market and their increased preparation for employment, experience periods of unemployment which are fewer and of shorter duration than graduates from non-co-op programs. From the investigation of participation rates above, it was concluded that labor force participation, on average throughout the three year graduate earnings period under investigation, was not significantly different between co-op and non-co-op samples. Another test of this hypothesis is whether co-op graduates devote less time to finding their first job after graduation. With this in mind, the mean length of time in months required in searching for the graduate's first job was stratified by selected variables including co-op participation and previous experience. The results of this breakdown are presented in Table 2.19.

In almost every instance on Table 2.19, individuals in the Previous Experience Sample spent less time looking for their first job (as expected), although significance at the 95 percent level of confidence was indicated only in the cases of non-co-op total, males, Whites, 4-year programs, Health Professions, and Liberal Arts; and in the case of co-op 2-year programs. In every co-op/non-co-op comparison on Table 2.19, the co-op graduate was able, on average, to find the initial job faster than the non-co-op graduate counterpart even though such differences were significant only in the Earnings Sample (i.e., with no previous experience). Significance at the 95 percent confidence level was obtained in this sample for all co-op/non-co-op comparisons except non-White, female, 2-year programs, Health Professions, Liberal Arts, and Trade & Industrial.

Other significant findings on Table 2.19 include differences between the sexes and the races for co-op participants with no previous experience (males and Whites took less time),

TABLE 2.19: MEAN TIME IN MONTHS REQUIRED TO FIND FIRST JOB BY GRADUATE AND SAMPLE CHARACTERISTICS AND CO-OP PARTICIPATION

GRADUATE CHARACTERISTICS		EARNINGS SAMPLE				PREVIOUS EXPERIENCE SAMPLE			
		CO-OP		NON-CO-OP		CO-OP		NON-CO-OP	
		Number	Mean	Number	Mean	Number	Mean	Number	Mean
Total		610	.81	1252	1.65	77	.65	340	1.04
Sex:	Male	500	.72	787	1.63	62	.76	271	1.09
	Female	110	1.22	465	1.70	15	.70	69	.88
Race:	White	569	.74	1157	1.65	64	.50	314	1.03
	Non-White	36	1.83	85	1.77	12	1.25	24	1.29
GPA:	Above Mean	402	.72	692	1.50	54	.59	227	1.21
	Below Mean	208	.98	560	1.84	23	.78	113	.72
Program Length:	2-Years	123	.74	450	1.29	37	.30	188	1.01
	4-Years	287	1.05	801	1.86	36	1.08	152	1.09
	5-Years	200	.51	0	--	4	0	0	--
Discipline Area:									
Engineering & Architectural		358	.67	210	1.14	18	1.22	61	.93
Business & Management		174	.75	400	1.75	40	.63	146	1.56
Health Professions		10	1.30	101	1.64	5	0	38	.37
Liberal Arts		48	1.79	451	1.94	10	.20	63	.59
Trade & Industrial		7	.71	46	.89	2	.50	18	.89

between high and low Grade Point Averages and 2-and 4-year programs for non-co-op graduates with no previous experience (above mean GPA and 2-year program graduates took less time). In addition, several significant differences were observed among the discipline areas. Co-op graduates with no previous experience took significantly less time to find the first job if their discipline area was Engineering & Architecture than if it was Liberal Arts. Non-co-op graduates with no previous experience took significantly less time to find the first job if their discipline area was Engineering & Architecture or Trade & Industrial than if it was Liberal Arts. Those non-co-op graduates with previous experience, however, faced a different set of expectations. The time necessary for Liberal Arts was less than that for Business & Management and the time necessary for Health Professions was less than for either Engineering & Architecture or Business & Management. The finding for Liberal Arts graduates with no previous experience was not surprising, but the pattern displayed relative to Liberal Arts and Health Professions for those with previous experience was.

Closely related to the ability to find a job quickly is success in finding the job best suited for the particular individual. This ability will reflect itself in the number of periods of unemployment over a set period of time. Presumably, the better suited the individual for his job, the less likely is the case that he will experience periods of unemployment. Table 2.20 compares the relative numbers of graduates who have experienced at least one period of unemployment of six weeks or more during the initial three years after graduation. As in Table 2.19, Table 2.20 indicates for cells with five or more observations that those graduates with previous experience consistently have a lower probability of experiencing one or more periods of unemployment that are six week in duration or more. Significant differences occured between experience levels only in the case of non-co-op graduates: male, White, both graduation dates, 4-year programs, and the discipline areas of Business & Management and Liberal Arts.

Looking at co-op/non-co-op comparison, co-op graduates, in every case with more than five observation but three (non-White, 2-year, and Liberal Arts graduates with no previous experience), display a lower probability of encountering such a period of unemployment. In the case of males, females, and White graduates, regardless of graduation date, with no previous experience, such differences between co-op and non-co-op are significant at the 95 percent level of confidence. As expected, males always have

TABLE 2.20: PERCENT OF GRADUATES EXPERIENCING PERIODS OF UNEMPLOYMENT DURING FIRST THREE YEARS FOLLOWING GRADUATION BY GRADUATE CHARACTERISTICS AND CO-OP PARTICIPATION[1]

GRADUATE CHARACTERISTICS		EARNINGS SAMPLE				PREVIOUS EXPERIENCE SAMPLE			
		CO-OP		NON-CO-OP		CO-OP		NON-CO-OP	
		NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Sex:	Male	98	19.6	232	29.5	9	14.5	57	21.0
	Female	48	43.6	239	51.4	5	33.3	29	42.0
Race:	White	127	22.3	434	37.5	11	17.2	81	25.8
	Non White	17	47.2	34	40.0	2	16.7	4	16.7
Graduation Date:	1970	48	25.5	179	42.6	3	25.0	12	18.2
	1973	85	23.0	259	35.4	8	19.5	55	27.6
Program Length:	2 Years	46	37.4	165	36.7	11	29.7	58	30.9
	4 Years	60	20.9	306	38.2	3	8.3	28	18.4
	5 Year	40	20.0	-	-	-	-	-	-
Discipline:									
Engineering & Architecture		52	14.5	42	20.0	1	5.6	9	14.8
Business & Management		55	31.6	126	31.5	7	17.5	32	21.9
Health Professions		5	50.0	43	42.6	2	40.0	18	47.4
Liberal Arts		29	60.4	237	52.5	3	30.0	20	31.7
Trade & Industrial		1	14.3	10	21.7	1	50.0	3	16.7

[1] Percentages refer to the proportions of the total population with the cell characteristics which experience one or more periods of unemployment of six weeks or more in length during the first three years of the graduate experience.

significantly lower probabilities of incurring such periods of unemployment (which is consistent with normal male-female participation rate differences, which may be related to the incidence of childbirth), and co-op Whites with no previous experience have a significantly lower probability (less than half) of being unemployed than their non-White counterparts. It was surprising that the date of graduation had a significant effect upon the occurrence of periods of unemployment only for non-co-op graduates with no experience. This is probably due to the fact that this variable did not measure the number of such unemployment periods, but simply reported if any had occurred.

On the other hand, the proportions of individuals experiencing an unemployment period of six weeks or more were significantly different by program length in all cases except non-co-op graduates with no previous experience. This was also the only instance in which the 2-year program proportion was not higher than the longer programs. Finally, significant differences in the proportions exist among the discipline areas in all instances except for co-op graduates with previous experience. Liberal Arts and Health Professions are consistently high, whereas Engineering & Architecture and Trade & Industrial are always low in these significant comparisons.

In sum, these results are consistent with earlier findings regarding earnings and labor force participation, and make clear that those graduates who have been in the labor market before (and are probably returning to old jobs) are much less likely to incur periods of unemployment.

The number of months necessary for finding the first job, and the occurrence of periods of unemployment, might well be functions of the source of the first job. Tabulations were made to determine how often co-op and non-co-op graduates used various sources to find their first job. These results are presented in Table 2.21. In terms of statistical significance, the distributions of source usages in the co-op columns is always significantly different (at a 95 percent level of confidence) from the corresponding distribution in the non-co-op column. At the same time, both the co-op and non-co-op column distributions are significantly different between previous experience and no previous experience. More than 35 percent of the co-op graduates (30% of the no previous experience graduates) obtained their jobs as a direct result of working in a co-op job (either from the employer or a similar contact). In addition, a substantially greater proportion of co-op students were able to obtain jobs as a result of school placement activities. The evidence is strong to support the contention that co-op participation assists the graduate in obtaining the first co-op related job through co-op employer contact and "in-school" efforts. On the other hand non-co-op graduates required greater reliance upon outside school contacts (e.g., agencies, ads, friends, and family).

TABLE 2.21: PERCENT USING EACH SOURCE FOR FINDING FIRST JOB AFTER GRADUATION BY SAMPLE CHARACTERISTICS AND CO-OP STATUS[1]

JOB SOURCES	EARNINGS SAMPLE				PREVIOUS EXPERIENCE SAMPLE			
	CO-OP		NON-CO-OP		CO-OP		NON-CO-OP	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
SCHOOL OR FACULTY PLACEMENT	177	29.5	235	19.5	20	27.0	62	19.1
NON SCHOOL SOURCE	140	23.3	782	65.0	19	25.7	190	58.6
CO-OP JOB OR CONTACT	218	36.3	0	0	22	30.0	0	0
NON-CO-OP JOB OR CONTACT	9	1.5	74	6.2	7	9.5	44	13.6
OTHER	57	9.5	112	9.3	6	8.1	28	8.6

[1] Percentages are for columns.

The tabulations shown in Table 2.21 were made separately by race, sex, program length, and discipline area. While no significant differences were observed between each of the racial strata and the distribution of responses displayed in Table 2.21 selected other strata did display such differences at a 95 percent level of confidence. Table 2.22 presents a summary of these comparisons. The first column of Table 2.22 indicates those strata which exhibit overall pattern responses significantly different from that observed in Table 2.21.

TABLE 2.22: SIGNIFICANT DIFFERENCES IN PATTERNS OF SOURCES FOR FINDING FIRST JOB BY SELECTED GRADUATE CHARACTERISTICS[1]

GRADUATE CHARACTERISTICS		DIFFERENT PATTERN FROM TABLE 2.21	EXPERIENCE DIFFERENCES		CO-OP/NON-CO-OP DIFFERENCES	
			CO-OP	NON-CO-OP	NO EXPERIENCE	EXPERIENCE
Total (Table 2.19)		--	*	*	*	*
Race:	White		*	*	*	*
	Non-White				*	*
Sex:	Male		*	*	*	*
	Female	*		*	*	*
Program Length:	2-year	*		*	*	*
	4-year	*		*	*	*
Discipline Area:						
Engineering & Architecture		*			*	*
Business & Management		*	*		*	*
Health Professions					*	*
Liberal Arts		*		*	*	
Trade & Industrial					*	

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[1] "*" indicates a significant difference at a 95 percent level of confidence using Chi-Square tests.

As a case in point, females consistently indicate that non-school sources were primarily used rather than co-op job or in-school sources. Apparently females either do not use these sources as efficiently as males, or do not have these sources as readily available to them. This same pattern or difference, however, is observed for 2-year programs. Non-school sources are used as the primary job finding method. (The significant difference for 4-year schools is accounted for by a heavy reliance on in-school sources as opposed to co-op contacts, with non-school sources remaining a minor source for co-op graduates.) This pattern is also observed for Liberal Arts and for Health Professions. Note that these discipline areas are typically female and are more likely to be associated with two-year programs. Thus the findings for females regarding the job sources may be indicative of the job placement activities of 2-year schools or the nature of the industries in which females typically seek jobs rather than any discriminatory activity directed toward females.

Finally, Engineering & Architecture displays a difference from Table 2.19 in that these co-op graduates utilize in-school job sources as frequently as co-op job contacts. This is consistent with the differences described earlier for 4-year schools. In addition, however, Engineering & Architecture non-co-op graduates also utilize in-school sources heavily. This is apparently a result of the strong ties between industry and education in this discipline area and the vocational nature of the training.

The remaining columns of Table 2.22 indicate significantly different patterns within each strata among column responses identified as in Table 2.21. For example, the female strata exhibited responses significantly different from those in Table 2.21 and further exhibited significant female differences between all columns except between co-op graduates with previous experience and without previous experience. (I.e., female co-op graduates of both the Earnings Sample and the Previous Experience Sample produced the same pattern of responses among job sources.) The consistent pattern of co-op/

non-co-op response differences is striking. Few significant response differences are found within each strata for co-op graduates on the basis of previous experience, however.

c. Fulfillment of Career Plans

It is hypothesized that co-op participation leads to jobs which are more closely related to the college skills acquired and the career plans of the graduate. To test this relationship, three tabulations were performed to measure response patterns comparing the graduate's college experience with the first job and the current job; and comparing the current job with career plans.

First, each graduate was asked how well the first job related to the college major. From the results in Table 2.23, co-op graduates were placed in jobs which were significantly better related to their college programs than were non-co-op graduates. This result confirms those presented in Table 2.21 where it was shown that co-op and school-related contacts were a significant impetus to co-op graduate employment, and is consistent with many of the other previous findings. The last item of note on Table 2.22 is that previous experience produced a significantly better match of school program to first job, but only in the absence of co-op participation.

TABLE 2.23: PERCENT INDICATING EACH RELATIONSHIP OF FIRST JOB TO COLLEGE MAJOR BY SAMPLE CHARACTERISTICS AND CO-OP STATUS[1/]

CHARACTERISTICS		DIRECTLY RELATED		SOMEWHAT RELATED		NOT RELATED	
		Number	Percent	Number	Percent	Number	Percent
Earnings Sample	Co-op	339	56.5	191	32.0	69	11.5
	Non-Co-op	540	44.6	337	27.8	335	27.6
Previous Experience Sample	Co-op	54	71.1	18	23.7	4	5.3
	Non-Co-op	165	50.6	102	31.3	59	18.1

[1/] Percentages are for rows.

Table 2.23 was tabulated by separate sex, race, program length, and discipline area strata. The results are presented in Table 2.24 and their interpretation is similar to that of Table 2.22. While Table 2.24 indicates a number of strata distributions that differ from the overall distribution, it is important to note that the difference is generally due to more random responses in selected individual strata. This can be seen by the lack of asterisks in the last four columns of Table 2.24 whenever there is an asterisk in the first column.

In fact, in many instances, the overall pattern of graduates with previous experience always providing first jobs more directly related to their college major, and co-op graduates finding first jobs more directly related to their college majors is often reversed (although not significantly so). For example, female co-op graduates with no previous experience reported first jobs related to college major more often than did female co-op graduates with previous experience. By the same token, graduates of Health Professions expressed almost the opposite response pattern to the overall pattern (although, again, the response differences within this strata are not significantly different). As more of these types of analysis are made, it is becoming increasingly clear that Health Professions and Liberal Arts, which are typically 2 years in length and most often chosen by females, are different with respect to their impacts on the graduates and with respect to the role that cooperative education plays.

Second, graduates were asked how well their college-acquired skills related to their current job.[1] From Table 2.25, it can be seen that there were significant co-op/non-co-op differences (at the 95 percent confidence level), regardless of the existence of previous experience. Co-op graduates consistently exhibit more directly related college skills relative to the current job than non-co-op graduates. Also, graduates with experience possess skills which were significantly more related to their jobs than was the case

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[1] In some instances, the current job may also be the first job.

TABLE 2.24: SIGNIFICANT DIFFERENCES IN PATTERNS OF MATCHES OF FIRST JOB TO COLLEGE MAJOR BY SELECTED GRADUATE CHARACTERISTICS[1]

GRADUATE CHARACTERISTICS		DIFFERENT PATTERN FROM TABLE 2.23	EXPERIENCE DIFFERENCES		CO-OP/NON-CO-OP DIFFERENCES	
			CO-OP	NON-CO-OP	NO EXPERIENCE	EXPERIENCE
Total (Table 2.21)		--		*	*	*
Race:	White		*	*	*	*
	Non-White	*				
Sex:	Male					
	Female	*		*	*	
Program Length:	2-year	*				
	4-year			*	*	*
Discipline Area:						
Engineering & Architecture		*	*			
Business & Management		*			*	*
Health Professions		*				
Liberal Arts		*				
Trade & Industrial						

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[1] "*" indicates a significant difference at a 95 percent level of confidence using Chi-Square tests.

for graduates with no experience, regardless of co-op participation. This finding is due to the fact that graduates with previous job experience are very likely to enter college programs which are strongly related to their pre-chosen career.

TABLE 2.25: PERCENT INDICATING EACH RELATIONSHIP OF COLLEGE SKILLS TO CURRENT JOB BY SAMPLE CHARACTERISTICS AND CO-OP STATUS[1]

CHARACTERISTICS		DIRECTLY RELATED		SOMEWHAT RELATED		NOT RELATED	
		Number	Percent	Number	Percent	Number	Percent
Earnings Sample	Co-op	228	39.7	282	49.0	65	11.3
	Non-Co-op	401	36.2	470	42.4	237	21.4
Previous Experience Sample	Co-op	43	58.9	25	34.2	5	6.8
	Non-Co-op	147	46.4	115	36.3	55	17.4

[1] Percentages are for rows; current job means job held at the time of the survey - 1976.

When this pattern is examined by individual stratum, only females and three of the discipline areas (as shown in Table 2.26) display response patterns different from those in Table 2.25. In addition, the differences seem to result, again, from a removal of significant within stratum differences and some tendency for a reversal of the pattern (although the reversal is never significant). Just as in the examination of first job matches above, the strata of females, Liberal Arts, and Health Professions display the atypical response patterns, and, again, suggesting that these discipline areas which are typically 2 years in length and frequented by females are different with respect to the role of cooperative education.

Lastly, the graduate was asked how the current job relates to the graduate's long-term career plans.[1] These results, which are specific for previous experience and co-op participation are presented in Table 2.27. Chi-Square tests were performed on

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[1] In some instances, the current job may also be the first job.

TABLE 2.26: SIGNIFICANT DIFFERENCES IN PATTERNS OF MATCHES OF COLLEGE SKILLS TO CURRENT JOB BY SELECTED GRADUATE CHARACTERISTICS[1]

GRADUATE CHARACTERISTICS		DIFFERENT PATTERN FROM TABLE 2.25	EXPERIENCE DIFFERENCES		CO-OP/NON-CO-OP DIFFERENCES	
			CO-OP	NON-CO-OP	NO EXPERIENCE	EXPERIENCE
Total (Table 2.23)		--	*	*	*	*
Race:	White		*	*	*	*
	Non-White					
Sex:	Male		*	*	*	*
	Female	*				
Program Length:	2-year					
	4-year			*	*	
Discipline Area:						
Engineering & Architecture						
Business & Management		*			*	*
Health Professions		*				
Liberal Arts		*	*			
Trade & Industrial						

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[1] "*" indicates a significant difference at a 95 percent level of confidence using Chi-Square tests; current job means job held at the time of the survey - 1976.

these data to compare the responses row-by-row, and two significant results were apparent. Non-co-op graduates with previous experience obtained jobs which were more closely related to career plans than was the case for non-co-op graduates with no previous experience. It was also found that co-op participation resulted in more career related jobs only in the case of graduates with no previous experience. The existence of previous work experience seems to dissipate the importance of co-op participation. These findings are not surprising. Greater relevant work experience either before or during school would lead the graduate to a job more closely related to the desired career. In particular, those with work experience who return to school (e.g., the veteran) have better ideas of what they want out of school and may, in addition, enter programs which are more vocationally oriented.

TABLE 2.27: PERCENT INDICATING RELATIONSHIPS OF CURRENT JOB TO CAREER PLANS BY SAMPLE CHARACTERISTICS AND CO-OP STATUS[1]

CHARACTERISTICS		DIRECTLY RELATED		SOMEWHAT RELATED		NOT RELATED	
		Number	Percent	Number	Percent	Number	Percent
Earnings Sample	Co-op	351	61.0	180	31.3	44	7.7
	Non-Co-op	599	54.0	362	32.6	148	13.3
Previous Experience Sample	Co-op	55	75.3	14	19.2	4	5.5
	Non-Co-op	200	63.1	83	26.2	34	10.7

[1] Percentages are for rows; current job means job held at the time of the survey -- 1976.

As with the previous tables, when stratifying by selected graduate or program characteristics as in Table 2.28, significantly different patterns emerge. These patterns move away from the tendency for co-op graduates to have current jobs more directly related to career plans than non-co-op graduates, and for those with previous experience to have current jobs more directly related to career plans than those with no experience.

TABLE 2.28: SIGNIFICANT DIFFERENCES IN PATTERNS OF MATCHES OF CURRENT JOB TO CAREER PLANS BY SELECTED GRADUATE CHARACTERISTICS[1]

GRADUATE CHARACTERISTICS		DIFFERENT PATTERN FROM TABLE 2.27	EXPERIENCE DIFFERENCES		CO-OP/NON-CO-OP DIFFERENCES	
			CO-OP	NON-CO-OP	NO EXPERIENCE	EXPERIENCE
Total (Table 2.25)		--		*	*	
Race:	White		*	*	*	*
	Non-White					
Sex:	Male		*	*	*	*
	Female	*				
Program Length:	2-year	*		*		
	4-year	*			*	
Discipline Area:						
Engineering & Architecture		*	*			*
Business & Management		*	*			*
Health Professions		*				
Liberal Arts		*				
Trade & Industrial						

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[1] "*" indicates a significant difference at a 95 percent level of confidence using Chi-Square tests, current job means job held at the time of the survey - 1976.

This movement away from such a pattern is toward random responses. In some instances, however, a reversal of the pattern is noted, although never significantly. Females show a tendency for non-co-op graduates to have more career-related current jobs, and this pattern is repeated for both Liberal Arts and Health Professions.

The combined findings for the total samples shown in the last three sets of tables make it clear that co-op participation leads to more relevant first job experiences, and after a period of time, continue to find jobs that are more directly related to their college experience than non-co-op graduates. Also, by this time the co-op graduates are still more likely to be pursuing their original career plans in their current jobs. The examination of individual strata generally confirm these findings, except for the typically female discipline areas of Liberal Arts and Health Professions. In these strata (including 2-year programs occasionally), the fulfillment of career plans seems to be more apt to occur for non-co-op graduates. This tendency, plus the different pattern of sources used to find the first job by the graduates, suggests that 2-year co-op programs in Liberal Arts and Health Professions (typically female strata) are distinct from other co-op programs and should be closely investigated.

d. Career Advancement

This last analytical part of Section I is an attempt to determine the rate at which advancement is made upon graduation from college. Such advancement is measured by the ratio of the last recorded salary to the first recorded salary normalized for the elapsed time between the two and expressed as a 3-year period of growth. Table 2.29 presents these ratios by sample, co-op status, and graduate characteristics.

There are a number of significant differences displayed in Table 2.29. Most of the differences are between previous experience and no previous experience. This occurs for both co-op and non-co-op graduates in the total, males, and White; whereas it occurs only

TABLE 2.29: CURRENT OR LATEST MONTHLY EARNINGS AS A PROPORTION OF INITIAL MONTHLY EARNINGS BY SAMPLE, CO-OP STATUS, AND GRADUATE CHARACTERISTICS, NORMALIZED FOR A THREE-YEAR PERIOD[1/]

GRADUATE CHARACTERISTICS	EARNINGS SAMPLE				PREVIOUS EXPERIENCE SAMPLE			
	CO-OP		NON-CO-OP		CO-OP		NON-CO-OP	
	Number	Ratio	Number	Ratio	Number	Ratio	Number	Ratio
Total	609	1.68	1250	1.87	77	3.14	337	2.44
Graduation Date: 1970	188	1.67	420	1.84	12	1.45	66	1.71
1973	368	1.60	729	1.75	41	1.24	197	1.81
Sex: Male	499	1.56	786	1.83	62	3.41	269	2.61
Female	110	2.25	464	1.95	15	2.04	68	1.73
Race: White	568	1.61	1155	1.84	64	3.07	311	2.42
Non-White	36	2.94	85	2.41	12	3.64	24	2.84
Program Length: 2-year	123	2.68	448	2.20	37	1.54	186	2.91
4-year	286	1.50	801	1.69	36	4.93	151	1.85
5-year	200	1.34	0	-	4	1.83	0	-
Discipline Area:								
Engineering & Architecture	357	1.38	210	1.58	18	3.21	61	1.63
Business & Management	174	2.06	400	2.07	40	3.90	144	3.00
Health Professions	10	1.10	100	1.39	5	1.43	38	1.71
Liberal Arts	48	2.86	450	2.05	10	1.04	63	2.55
Trade & Industrial	7	1.47	46	1.57	2	3.48	18	2.57

[1/] Ratios calculated as [(last salary/first salary)/(elapsed time in months)] · 36.

for co-op graduates of 4-year programs or in the discipline areas of Engineering & Architecture, Business & Management, and Trade & Industrial. (Note that it does not occur for female, 2-year, Health Professions or Liberal Arts.) These significant differences by experience level always indicate more rapid salary advancement for those with past experience. Thus, it would seem as if previous experience leads to significantly greater salary increases even if it doesn't lead to larger initial salaries. It is surprising that in only one instance was there a significant co-op/non-co-op difference: graduates with previous experience in 4-year programs exhibit a higher growth in earnings if they participated in co-op.

Other significant findings are for co-op graduates with no previous experience: females experience a greater growth in earnings than males, Non-Whites greater than Whites, 2-year greater than 4-year, and Liberal Arts and Business & Management greater than Engineering & Architecture. Most of these comparisons are explained by some narrowing of the initial starting salary differentials over time. Finally, all of the 2-year/4-year comparisons were significant, with three out of the four comparisons showing greater salary increases for 2-year programs. The one exception was for co-op graduates with previous experience who displayed significantly greater salary increases for the 4-year programs.

3. Multivariate Analysis

In this subsection, the combined influence of a number of interdependent variables on graduate outcome measures, primarily earnings, will be examined. The purpose of this analysis is to try to identify those factors in the graduate's college and postcollege experience which can best explain the degree of success in work that is achieved. To carry out this task, four series of multiple regression analyses were performed.

First, the set of independent variables (to be described below) was related to two alternative measures of the graduate's financial success in the graduate work experience. The first of these is the average monthly earnings over the 36-month period of observation. However, because this is so strongly influenced by the number of months not working which might obscure the impact of other variables, and because it is an important measure of financial success in work in its own right, the latest reported monthly earnings figure was also used as a dependent variable for these analyses.

The second series of analyses replicated the first, except that two parallel sets of regressions were performed--one for co-op graduates and the other for those non-co-op graduates who had a significant amount of work experience while in college. This was to determine if the co-op experience was no more than simply the equivalent of holding a job while in college, and to determine if different factors had differential impacts on the earnings of these two groups of graduates, particularly in terms of the influence of the amount of experience since graduation.

The third series of analyses looked at the impact of the same set of independent variables on a measure of career advancement. For those analyses, this outcome measure was operationalized as the ratio of current to initial earnings.

Finally, a fourth series of analyses was performed to examine which, if any, of the components of their experience could help explain the graduates' satisfaction with their current job.

The set of independent variables used in these analyses to measure features of the graduates' college and postcollege experiences that might impact on job success were specified as:

- Length of program--2-, 4-, or 5-year;
- Experience--length of time since graduation;
- Race--White vs. non-White;
- Relatedness of job to college program;
- Region--Northeast, South, North Central, West;
- Unemployment--number of months not working during graduate experience;

- Grade point average;
- Time taken to find first job;
- Placement source--school placement, job placement agency, newspaper ad, co-op employer, contacts made on a co-op job, contacts with family or friends, faculty member, other; and
- Co-op vs. non-co-op.

For each of these four series of analysis, regression equations were produced for each of the five program areas under study--Business & Management, Engineering & Architecture, Health Professions, Liberal Arts, and Trade & Industrial--and for males and for females. The base group for the regression is always non-co-op, White, 5-year, North Central, and "other" placement.

In all but the second series of analyses,[1] the final specification was determined through a step-wise procedure with the cutoff chosen as the last variable that entered significantly. Of course, some of the variables that had previously entered will lose their significance as other variables enter, but they are retained in the final specification nevertheless. Since the variables were measured on very different scales, beta weights rather than the raw regression coefficients are reported. These weights provide a greater degree of comparability in examining the relative impact of each of the factors on the outcome measures of the financial success and job satisfaction of these graduates in their jobs. Those beta weights which are statistically significant at a 95 percent level of confidence are indicated with an asterisk.

a. Basic Earnings Regressions

The purpose of these regressions is to separate out the influence on graduate earnings of factors not associated with co-op participation and to separately identify and measure the several influences that are associated with co-op participation. Finally, the purpose is to also examine the variations in these influences among the discipline areas and between the sexes. Table 2.30 displays the finding for all disciplines and both sexes.

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[1] The procedure used for the second series will be described separately, below.

TABLE 2.30: STANDARDIZED REGRESSION COEFFICIENTS (BETAS) OF SELECTED VARIABLES USING MEAN MONTHLY AND LATEST MONTHLY GRADUATE EARNINGS AS DEPENDENT VARIABLES BY DISCIPLINE AREA OR SEX[1]

VARIABLES	DISCIPLINE AREA										SEX			
	BUSINESS & MANAGEMENT		ENGINEERING & ARCHITECTURE		LIBERAL ARTS		HEALTH PROFESSIONS		TRADE & INDUSTRIAL		MALE		FEMALE	
	Mean	Latest	Mean	Latest	Mean	Latest	Mean	Latest	Mean	Latest	Mean	Latest	Mean	Latest
Program Length:														
2-year	-.56	-.52	--	--	--	--	--	--	-.04	-.08	-.04	-.08	-.84*	-.85*
4-year	--	--	--	--	--	--	.26*	.27*	--	--	--	--	-.71	-.61
Region:														
Northeast	-.09*	-.13*	--	--	-.06	-.18*	--	.34	-.09*	-.13*	-.09*	-.13*	--	-.10
South	--	-.10*	-.13*	-.11*	--	-.12	.17	.33*	-.07*	-.09*	-.07*	-.09*	--	-.13*
West	--	--	--	--	--	--	.40*	--	--	--	--	--	--	--
Time Since Graduation	.10*	.16*	.12*	.19*	--	.07	.22*	.27*	.09*	.15*	.09*	.15*	.17*	.21*
Months Not Working	-.50*	--	-.41*	-.10*	-.47*	-.08	-.54*	-.12	-.45*	-.10*	-.45*	-.10*	-.60*	--
Grade Point Average	.17*	.22*	--	--	-.08	-.08	--	-.13	--	-.09*	--	.09*	.08*	.11*
Time to First Job	--	--	--	--	--	-.09	--	-.14	--	--	--	--	--	-.13*
Co-op	.03	.08	--	.25	--	--	-.20*	--	.15*	.19*	.15	.19*	--	--
Co-op and 2 year	-.04	--	--	--	--	--	--	--	-.09*	-.06*	-.09*	-.06*	--	--
Co-op and 4 year	--	--	-.04	--	--	--	--	--	--	--	--	--	--	--
Related Job	--	--	--	--	.07	--	--	--	--	.07*	--	.07*	--	--
Placement:														
School	--	--	--	--	--	--	--	--	.07*	.08*	.07*	.08*	--	--
Agency	-.08*	-.10*	--	--	--	--	-.14	-.24*	--	--	--	--	--	--
Newspaper	--	--	--	.09*	-.06	-.07	--	--	--	--	--	--	--	--
Co-op Employer	--	--	.17*	.18*	--	--	--	--	.11*	.11*	.11*	.11*	--	--
Family	--	--	--	--	-.09	-.10	--	.16	--	--	--	--	--	--
Faculty	--	--	--	--	-.12*	-.11	--	--	--	--	--	--	--	--
Non-White	--	--	--	--	--	--	.11	.11	--	--	--	--	--	--
	$\bar{R}^2$=.52, DF=589	$\bar{R}^2$=.28, DF=574	$\bar{R}^2$=.22 DF=573	$\bar{R}^2$=.09, DF=568	$\bar{R}^2$=.23 DF=355	$\bar{R}^2$=.04 DF=337	$\bar{R}^2$=.47 DF=109	$\bar{R}^2$=.33, DF=106	$\bar{R}^2$=.46 DF=60	$\bar{R}^2$=.06, DF=58	$\bar{R}^2$=.37, DF=1324	$\bar{R}^2$=.20 DF=1290	$\bar{R}^2$=.48, DF=423	$\bar{R}^2$=.14, DF=412

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[1] The figures on this table are standardized to remove the influence of scale on the coefficients; "*" indicates statistical significance at a 95 percent level of confidence; $\bar{R}^2$ is the adjusted coefficient of multiple determination; DF is the Degrees of Freedom in the regression; the base group for the regression is Non-Co-op, 5-year, North Central, Other Placement, and White.

Before describing the results of individual regressions, it is important to note how consistent the findings are. There are very few sign changes among the several regressions and estimates for a given variable are generally of the same magnitude. While the adjusted R^2 is typically low, the variables selected were able to consistently explain a higher proportion of mean earnings than the latest earnings. Race, related job, and the program length/co-op interaction terms seldom entered the specifications, whereas region, time since graduation, and months not working (especially for mean earnings) were most often important. Finally, while the variable "co-op" was important only about half of the time, it is important to keep in mind that the influence of the co-op program is distributed throughout a number of the other variables.

Business & Management

For graduates of Business & Management programs, Table 2.30 shows that a limited set of factors appear to have the major impact on both of the outcome measures of financial job success: average and latest earnings. As would be expected, and as is consistently found throughout all of these series of analyses, average earnings are very strongly negatively related to the number of months out of work. However, there are several factors which play an important role in predicting both measures of financial success for these graduates.

The variable which was most important in explaining latest earnings and which was next most important after time not working in explaining average earnings was the length of the program. Those who graduated from 2-year Business & Management programs, as compared to those from 4 or 5-year programs, are at a decided disadvantage in terms of earnings capacity. Also, having had a higher grade point average, having been a co-op student, and having been out of school for a longer period of time all have a positive impact on both earnings measures.

On the other hand, if the placement source for the graduate's first job was a job placement agency, and if the school was located in the East, then the graduate's average and latest earnings were likely to be lower. In terms of latest earnings, there was also a significant negative weight for having graduated from a school in the South.

There was a weak negative interactive effect between co-op status and program length for the mean earnings regression. This can be verified by examination of the mean earnings which shows that the co-op advantage in earnings is much smaller for a graduate of 2-year programs ($354 vs. $338) than for graduates of 4-year Business & Management programs ($647 vs. $513).

Engineering & Architecture

For Engineering & Architecture graduates, number of months not working is again the most important variable in predicting average earnings, and has a significant negative impact on the graduate's latest earnings. Table 2.30 shows that the length of time since graduation has a significant positive coefficient in the evaluations for both measures of earnings. Having found one's first job through a co-op employer produces a significant positive impact on both average and latest earnings. While co-op Engineering & Architecture graduates in general earn more than non-co-op, it is interesting that the use of the co-op employers as a job placement mechanism is of much importance in predicting financial success among engineering graduates.

As was the case for Business & Management graduates, having graduated from a school located in the South is negatively linked to financial success. Finally, in predicting the latest monthly earnings, two additional variables have significant coefficients. Both having a job which is related to what one learned in college and having found one's first job through a newspaper advertisement produce positive impact.

Liberal Arts

For Liberal Arts graduates, there is a very low degree of predictability of financial success using the set of independent variables under study. While Table 2.30 presents the relative impact of a number of variables, only a few (two in predicting average earnings, one for latest earnings) have significant coefficients in the regression equations. As with previous discipline areas, the number of months not working has a significant negative impact on average graduate earnings. The only other variable with a significant influence on average earnings is the use of a faculty member for job placement. Interestingly, the influence of this variable is negative on the financial success of the graduate. The only variable which was significant in predicting the graduate's latest monthly earnings was whether or not the school from which he was graduated was located in the East. This variable had a negative impact on this measure of financial success. While not significant, it is interesting to note that, in contrast to what was found for Business & Management, grade point average had a consistently negative impact on both measures of the financial success of Liberal Arts graduates.

Health Professions

For graduates of the Health Professions discipline area, these variables had a consistently significant role in predicting both earnings measures. Table 2.30 shows that having been in a 4-year program, having graduated from a school in the West, and having been out of school for a longer period of time, all have significant positive impacts on the financial success of Health Professions graduates. In addition, as is the case in most discipline areas, the number of months not working is the most important factor in predicting average earnings. It appears that average earnings are reduced by having been in a co-op program, but, because of the small number of observations for Health Professions co-op graduates in our sample, this result should be interpreted with a great deal of caution.

In predicting the latest earnings of the Health Professions graduates, two other variables have significant influences. Having found one's first job through a job placement agency is negatively linked to the latest monthly earnings while having graduated from a school in the South has a positive impact. It should be noted that, while not significant, these same two variables show the same pattern in predicting the average earnings of Health Professions graduates.

Trade & Industrial

Since our sample of Trade & Industrial graduates is very small, we cannot attach a very strong weight to the results of the analysis for this area. In each equation, there is only one variable which has a significant weight in predicting financial success, although there is a consistent pattern of moderate influence for several variables. Besides the significant influence of months not working, the average earnings of Trade & Industrial graduates are positively influenced by having a discipline area related job, by having found one's first job through the school placement service, and by having had a higher grade point average.

In addition, there is an interactive effect of co-op and program length in which co-op participation is negatively related to earnings for graduates of 2-year programs, while such participation has a positive impact among graduates of 4-year programs. However, again, it must be reiterated that the very small sample size makes these findings extremely tentative. In relation to the latest earnings of Trade & Industrial graduates, the same four variables as mentioned above (grade point average, months not working, school placement, and related job) show a similar pattern of effects. In this case, only the school placement variable has a significant coefficient. Finally, job placement through an agency, job placement through a faculty member, and having attended a school located in the West all have positive impacts on the latest earnings measure of financial success for Trade & Industrial graduates.

Sex

The same sets of regressions were performed for all males and for all females as were performed for each of the five discipline areas to determine if different sets of factors were important in predicting the financial success of male versus female graduates. Although Table 2.30 shows that many more factors affected the earnings of male graduates than female graduates, most of the variables that affected both, however, did so in similar ways. Notable exceptions are the lengths of program variables.

Female graduates of 2-year programs have significantly lower earnings than those from 4-or 5-year programs and, while not significant and with not so large an effect, the same direction of impact for this variable was observed for males. However, once this effect is taken into account, only for females does the 4-versus 5-year program distinction enter into this predictive equation. Thus, while only a small number of females are in 5-year programs, a significant positive impact on their earnings capacity was observed, whereas for males, Table 2.30 shows no such impact. This is clear from a $65 average earnings difference and a $195 latest earnings difference between 4-year and 5-year program for females, whereas the corresponding difference for males is only $10 and $6, respectively.

At the same time, having participated in a co-op program has a positive impact on the graduate's financial success only among males. Also only for males, a significant interactive effect between co-op status and program length was observed. The negative coefficient attached to the combined effect of co-op and 2-year program shows that co-op participation provides less of an advantage in terms of earnings for male graduates from 2-year programs than co-op participation in other program lengths.

For both males and females, the length of time since graduation has a significant positive weight in the equations predicting both measure of financial success. Grade point average also has a significant positive impact on both earnings measures for females and on the latest earnings for males. Having attended a school located in the South or the East has a significant negative weight in predicting average and latest earnings of males and shows a similar, although not always significant, effect on the latest earnings of females.

Finally, for males only, the source of placement in one's first job plays a significant role in predicting financial success. If the job was found through either the school placement service or through a co-op employer, both average and latest earnings are likely to be higher than otherwise.

b. Work Experience Regressions

A second review of analyses was performed in order to ascertain if the co-op student work experience was different from the work experience of non-co-op students who had significant levels of work experience.[1/] For each discipline area or sex, parallel regressions were run for both co-op graduates and non-co-op graduates so defined. The "best" equation specification was chosen for each discipline area or sex on the basis of a series of preliminary regression runs during which significant variables were identified. Any variable which was significant in preliminary discipline area or sex, co-op status, graduate earnings measure of specific regressions was included in the first specification for that discipline area or sex. In other words, the union of all of the significant variables identified during separate regressions for each co-op status, graduate earnings measures, discipline area or sex combination determined the final specification. With regression results on these final specifications, tests for structural differences between the co-op and non-co-op estimates can be

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[1/] "Significant" was defined as $1000 of non-co-op student earnings annually.

conducted in order to ascertain if the co-op working experiences differentially influenced the subsequent graduate earnings when compared to significant levels of non-co-op working experiences.[1/]

The results of such regressions and the tests for structural differences are presented in Table 2.31 (using mean monthly graduate earnings) and Table 2.32 (using the latest montly graduate earnings). Typically, around 50 percent of the variation in mean monthly graduate earnings were explained by the final specification while only around 20 percent of the variation in the latest graduate earnings were generally explained by the same specifications, even though the patterns of significant variables were remarkably similar. Of more importance, however, are the findings of co-op/non-co-op structural differences.

Co-op and non-co-op differences were identified through F-tests for both sexes and for Business & Management graduates using both earnings measures. On the other hand, Engineering & Architecture graduate earnings were explained by the same set of factors regardless of co-op participation. Data were not sufficient for either Trade & Industrial or Health Professions and conflicting results were observed for Liberal Arts, so that the net results indicate that co-op participation "counts" overall for both sexes and for the specific discipline areas of Business & Management, but not for Engineering & Architecture.

c. Career Advancement

The third series of regressions used the same set of independent variables described previously to try to explain the degree of career advancement, as measured by the ratio of current earnings to

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[1/] The statistical test used is given by:

$$F = \frac{(RSS_N - RSS_A)/k}{RSS_A/\text{sum of degrees of freedom}}$$

where RSS_N is the residual sum of squares under the null hypothesis that the regression coefficients are the same in both co-op and non-co-op (i.e., with the two groups pooled) and RSS_A is the residual sum of squares under the alternate hypothesis that the two groups are different and k is the number of variables.

TABLE 2.31: STANDARDIZED REGRESSION COEFFICIENTS (BETAS) OR SELECTED VARIABLES USING MEAN MONTHLY GRADUATE EARNINGS AS THE DEPENDENT VARIABLE BY DISCIPLINE AREA OR SEX[1]

VARIABLES	DISCIPLINE AREAS						SEX			
	BUSINESS & MANAGEMENT		ENGINEERING & ARCHITECTURE		LIBERAL ARTS		MALE		FEMALE	
	Co-op	Non Co-op	Co-op	Non Co-op	Co-op	Non Co-op	Co-op	Non Co-op	Co-op	Non Co-op
Program Length:										
2-year	-.44*	-.31*	--	--	--	--	-.16*	-.14*	-.32*	-.26*
4-year	--	--	.15*	.19*	--	--	--	--	--	--
Region:										
Northeast	.04	-.11*	--	--	--	--	-.03	-.11*	--	--
South	--	--	-.19*	-.19*	--	--	-.06	-.08	--	--
West	--	--	-.03	-.23*	-.18*	.16*	--	--	--	--
Time Since Graduation	.17*	.11*	.11*	.20*	.28*	.16*	.13*	.09*	--	--
Months Not Working	-.46*	-.63*	-.35*	-.65*	-.62*	-.67*	-.39*	-.64*	-.50*	-.65*
Grade Point Average	.20*	.12*	.00	.14	--	--	.04	.07	.14	.04
Time to First Job	--	--	--	--	--	--	--	--	-.19*	.01
Related Job	--	--	.01	.28*	-.10	.13	.00	.09*	-.07	.51*
Placement:										
School	--	--	-.03	.22*	.14	-.13	.01	.16*	.22*	-.07
Agency	-.06	-.10	--	--	--	--	--	--	--	--
Family	.08	-.09	--	--	--	--	--	--	--	--
	$\bar{R}^2$=.48 DF=155	$\bar{R}^2$=.55 DF=176	$\bar{R}^2$=.14 DF=337	$\bar{R}^2$=.58 DF=68	$\bar{R}^2$=.54 DF=29	$\bar{R}^2$=.53 DF=95	$\bar{R}^2$=.21 DF=475	$\bar{R}^2$=.54 DF=337	$\bar{R}^2$=.50 DF=78	$\bar{R}^2$=.66 DF=64
	F = 2.88*		F = 1.14		F = 3.10*		F = 4.81*		F = 5.53*	

[1] The figures on this table are standardized to remove the influence of scale on the coefficients; "Non-Co-op" includes only those graduates with $1000 or more of non-co-op student earnings annually; "*" indicates statistical significance at a 95 percent level of confidence; $\bar{R}^2$ is the adjusted coefficient of multiple determination; DF is the Degrees of Freedom in the regression; the base group is 5-year, North Central, Other Placement, and White; "F" is the F-test for structural differences between the regression equations for Co-op and Non-Co-op graduates.

TABLE 2.32: STANDARDIZED REGRESSION COEFFICIENTS (BETAS) OF SELECTED VARIABLES USING LATEST MONTHLY GRADUATE EARNINGS AS THE DEPENDENT VARIABLE BY DISCIPLINE AREA OR SEX[1]

VARIABLES	DISCIPLINE AREAS						SEX			
	BUSINESS & MANAGEMENT		ENGINEERING & ARCHITECTURE		LIBERAL ARTS		MALE		FEMALE	
	Co-op	Non Co-op	Co-op	Non Co-op	Co-op	Non Co-op	Co-op	Non Co-op	Co-op	Non Co-op
Program Length:										
2-year	-.45*	-.37*	--	--	--	--	-.19*	-.19*	-.37*	-.30*
4-year	--	--	.16*	.21	--	--	--	--	--	--
Region:										
Northeast	.03	-.15*	--	--	--	--	-.04	-.19*	--	--
South	--	--	-.19*	-.10	--	--	-.08	-.13*	--	--
West	--	--	.02	-.25*	-.17	-.22*	--	--	--	--
Time Since Graduation	.22*	.15*	.19*	.32*	.26	.33*	.20*	.17*	--	--
Months Not Working	-.09	-.06	-.07	-.07	-.19	-.16	-.11*	-.09	-.09	-.11
Grade Point Average	.29*	.15*	.04	.26*	--	--	.10*	.13*	.26*	-.10
Time to First Job	--	--	--	--	--	--	--	--	-.37*	.03
Related Job	--	--	.05	.38*	-.14	.17	.02	.15*	-.08	.64*
Placement:										
School	--	--	-.01	.22*	.21	-.09	.01	.20*	.23*	-.02
Agency	-.07	-.16*	--	--	--	--	--	--	--	--
Family	.06	-.13	--	--	--	--	--	--	--	--
	$\bar{R}^2$=.26 DF=153	$\bar{R}^2$=.17 DF=169	$\bar{R}^2$=.05 DF=333	$\bar{R}^2$=.34 DF=68	$\bar{R}^2$=.06 DF=29	$\bar{R}^2$=.15 DF=91	$\bar{R}^2$=.09 DF=469	$\bar{R}^2$=.19 DF=320	$\bar{R}^2$=.28 DF=76	$\bar{R}^2$=.39 DF=63
	F = 2.88*		F = 1.14		F = 1.86		F = 4.85*		F = 5.53*	

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[1] The figures on this table are standardized to remove the influence of scale on the coefficients; "Non-Co-op" includes only those graduates with $1000 or more of non-co-op student earnings annually; "*" indicates statistical significance at a 95 percent level of confidence; $\bar{R}^2$ is the adjusted coefficient of multiple determination; DF is the Degrees of Freedom in the regression; the base group is 5-year, North Central, Other Placement, and White; "F" is the F-test for structural differences between the regression equations for Co-op and Non-Co-op graduates.

initial earnings. The degree of predictability of career advancement from this set of independent variables was extremely low. The maximum adjusted R^2 for any of the sex regressions by discipline area was 0.08. Not surprisingly, the variable that most often had a significant impact on advancement was the length of time since graduation.

Table 2.33 shows that among Business & Management graduates, the only other variable which had a significant impact on career advancement was the number of months not working, which had the expected negative effect on this outcome measure.

For Engineering & Architecture graduates, several variables had some impact on career advancement. Having attended school in the South or West had a positive effect on the graduate's rate of growth, while having been placed in one's first job by the school placement service or through the co-op employer had a significant negative impact on advancement. Also, the length of time spent looking for the first job had a positive impact on this outcome measure. In general, these variables had the opposite relationship with earnings than they did with this measure of career advancement. Thus, they are probably not causal factors in career advancement except in the sense that those who start out with very low earnings may tend to show, on a percentage basis, a greater rate of growth than those starting at higher salary levels.

Among the graduates of Liberal Arts programs, the only variable, other than length of time since graduation, that had a significant impact on career advancement was the combined effect of having been in co-op and in a 2-year program. This variable was shown to be positively related to the rate of growth of earnings.

For the Health Professions graduates, there was a significant positive impact on career advancement if the graduate had attended college in the West or the East, or if the first job was found through the school placement service. Among Trade & Industrial graduates, only length of time since graduation had a significant weight in predicting career advancement, and the impact was positive as expected.

TABLE 2.33: STANDARDIZED REGRESSION COEFFICIENTS (BETAS) OF SELECTED VARIABLES USING CAREER ADVANCEMENT AS DEPENDENT VARIABLE BY DISCIPLINE AREA OR SEX[1]

VARIABLES	DISCIPLINE AREAS					SEX	
	BUSINESS & MANAGEMENT	ENGINEERING & ARCHITECTURE	LIBERAL ARTS	HEALTH PROFESSIONS	TRADE & INDUSTRIAL	MALE	FEMALE
Region:							
Northeast	--	--	--	.51*	--	--	--
South	--	.14*	--	--	--	--	--
West	--	.10*	--	.34*	--	--	--
Time Since Graduation	.15*	.16*	.12*	--	.39*	.14*	--
Months Not Working	-.16*	--	-.08	--	--	-.08*	-.10*
Time to First Job	--	.09*	--	--	--	--	--
Co-op and 2 year	--	--	.17*	--	.25	--	--
Placement:							
School	--	-.20*	--	.21*	--	-.13*	--
Newspaper	--	--	--	.17	--	--	.13*
Co-op Employer	--	-.15*	--	--	--	--	--
Co-op Contacts	--	--	-.08	--	--	-.06*	--
Family	--	--	.10	--	--	-.09*	--
Faculty	--	--	--	--	--	--	.13*
	$\bar{R}^2$=.03 DF=590	$\bar{R}^2$=.07 DF=573	$\bar{R}^2$=.03 DF=355	$\bar{R}^2$=.00 DF=109	$\bar{R}^2$=.08 DF=60	$\bar{R}^2$=.04 DF=1325	$\bar{R}^2$=.02 DF=423

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[1] The figures on this table are standardized to remove the influence of scale on the coefficients; "*" indicates statistical significance at a 95 percent level of confidence; $\bar{R}^2$ is the adjusted coefficient of multiple determination; DF is the Degrees of Freedom in the regression; the base group for the regression is Non-Co-op, 5-year, North Central, Other Placement, and White.

In the regressions run for females, the number of months not working had a significant negative effect on their career advancement. In addition, having found one's first job through a newspaper ad or through a faculty member displayed a significant positive influence in predicting the rate of growth in earnings for female graduates.

On the other hand, for males, even though the number of months not working also had a significant negative impact on career advancement, the length of time since graduation had a significant positive impact on career advancement, as well as placement in the first job by means of the school placement service, through contacts made on a co-op job, or through contacts with friends or family.

d. Job Satisfaction Regressions

The fourth and last series of analyses used the set of independent variables described previously, plus the two measures of graduates' earnings, to try to explain reports of graduate job satisfaction. The measure of job satisfaction used was an index comprised of responses to the following six questions:

- Do you decide how things are done on your job?
- Does your boss often ask your opinion about work-related matters?
- Does your job get you interested enough in things to try to learn about them after work?
- Does your boss tell you when you do a good job?
- Do you do things off the job with the people you work with?
- Do you get paid less than other workers who do the same job?

By scoring one point for each response indicating satisfaction, a score from zero to six was possible for each individual. The mean score established for the overall sample was 1.5.

In every case, the degree of predictability of job satisfaction from this set of variables was extremely limited as shown on Table 2.34. The maximum adjusted R^2 in any of the regressions was

TABLE 2.34: STANDARDIZED REGRESSION COEFFICIENTS (BETAS) OF SELECTED VARIABLES USING JOB SATISFACTION AS DEPENDENT VARIABLE BY DISCIPLINE AREA OR SEX[1/]

VARIABLES	DISCIPLINE AREAS					SEX	
	BUSINESS & MANAGEMENT	ENGINEERING & ARCHITECTURE	LIBERAL ARTS	HEALTH PROFESSIONS	TRADE & INDUSTRIAL	MALE	FEMALE
Region:							
Northeast	.12*	--	--	--	--	--	--
West	--	--	--	--	--	--	.11
Months Not Working	--	--	--	--	--	--	.21*
Time to First Job	--	--	-.13*	--	--	-.07*	-.09
Co-op	--	--	--	--	--	--	-.37
Co-op and 2 year	.59	--	--	--	--	--	--
Related Job	.07	.18*	.12*	--	--	.11*	.10*
Placement:							
School	--	--	--	--	--	-.05	.07
Agency	.12*	--	--	--	--	--	--
Newspaper	--	--	--	-.21*	--	--	-.05
Co-op Contacts	--	--	--	--	--	.04	--
Family	.12*	--	--	--	--	--	--
Faculty	.12*	--	--	--	--	--	.10*
Mean Earnings	.24	-.26*	--	.43	--	--	--
Latest Earnings	--	.30*	--	--	--	.18*	-.12
	$\bar{R}^2$=.06 DF=574	$\bar{R}^2$=.05 DF=568	$\bar{R}^2$=.01 DF=337	$\bar{R}^2$=.03 DF=106	$\bar{R}^2$=.00 DF=58	$\bar{R}^2$=.03 DF=1290	$\bar{R}^2$=.06 DF=412

[1/] The figures on this table are standardized to remove the influence of scale on the coefficients; "*" indicates statistical significance at a 95 percent level of confidence; $\bar{R}^2$ is the adjusted coefficient of multiple determination; DF is the Degrees of Freedom in the regression; the base group for the regression is Non-Co-op, 5-year, North Central, Other Placement, and White.

0.06, which implies that job satisfaction (or at least the measure of job satisfaction used here) is not explainable in terms of this particular set of independent variables. The only variable of this set which did show a consistent pattern of relationship to this measure of job satisfaction was whether or not the graduate's job was related to what was learned in college. This variable had a consistently positive, and in most cases significant, impact on the graduate's satisfaction with his/her job, indicating that relevance of the job to the college curriculum increases the graduate's level of job satisfaction as measured by the six questions above.

D. Summary of Rate of Return and Graduate Analysis

To this point in Chapter 2, the results of the rate of return analysis and the graduate analysis point to several clear conclusions. As described in the Summary of Rate of Return Analysis (Section I.B.4, above), it is clear that almost all of the college education investment options considered are financially rewarding, and, further, that these returns can be enhanced by participating in a cooperative education program. This is most vividly demonstrated by the fact that the returns to a 5-year co-op program are higher than the returns to a corresponding 4-year non-co-op program. This means that co-op participation is to be encouraged even though it may lead to a strengthening of the time spent in completing the program, because the returns generated thereby will more than compensate for the added cost of additional training (and foregone earnings).

In addition, the rate of return analysis indicated that the highest returns generally were exhibited for 4-year rather than 2-year programs, and that females seem to benefit more than males from a college education, particularly in non-co-op programs. Finally, the rate of return analysis concluded that the discipline areas of Business & Management and Engineering & Architecture exhibited the highest returns whereas Health Professions and Liberal Arts exhibited the lowest returns.

The graduate analysis was conducted, in part, to ascertain the extent to which the patterns displayed by the rate-of-return analysis are determined by or are consistent with the earnings of program graduates as opposed to differentials in training costs. In other words, are the gains to co-op participation due to enhanced graduate earnings or lowered costs of education?

In general, the graduate experience supports the findings from the rate of return analysis. Stratification of graduate earnings by the rate of return cohort identifiers produces earnings patterns which are consistent with the findings of the rate of return analysis. By the same token, while no significant differences were observed in mean hours of work, the labor force participation rates did vary by discipline area, although not by co-op status. Thus, it can be said that much of the return to co-op participation is attributable to higher graduate earnings. The extent to which the student experience is also a contributor must await the analysis of the next section (Section II). First, however, some other interesting findings resulted from the Graduate Analysis.

The first of these is that the decision to exclude those with previous experience from the rate-of-return calculations was justified. These individuals consistently exhibited significantly different earnings levels, and it often appeared that previous experience and co-op participation were substitutable attributes. That is, it was most often the case that a particular earnings level could be obtained either by having previous experience or by participating in a co-op program. Of further interest is the fact that the effects of the two attributes are not additive. Co-op participation is not profitable for an individual with previous experience.

Other earnings differentials exhibited few consistent patterns except that strong East-West differentials were indicated. The differences were explained, however, by the distributions of graduates by discipline area. In the West, the distribution was shifted toward the lower paying discipline areas of Liberal Arts and Health

Professions, whereas the distribution in the East was shifted toward the higher paying discipline areas of Engineering & Architecture and Business & Management.

Graduate experiences relative to job satisfaction, job responsibility, work continuity, and career plans were examined next. No job satisfaction differences were statistically significant, nor were differences in job satisfaction observed among other sample stratifications (e.g., sex, race, GPA, program length, discipline area). Some differences in levels of job responsibility were identified, however, by co-op status. These difference indicated that co-op participation leads to somewhat greater job responsibility upon graduation, which is consistent with the earlier finding that co-op participation is treated, in many respects, as similar to previous experience by the employer in terms of earnings.

Both co-op participation and previous experience displayed some tendency to reduce the period necessary to find the first job and to lower the probability of encountering periods of unemployment of six weeks or more. Part of the explanation for these findings relative to co-op participation is in the difference in sources that graduates use to find their first jobs. Those with no co-op experience lean heavily on outside school contacts (e.g., agencies, ads, friends), whereas co-op graduates lean heavily on contacts with co-op employers and "in-school" efforts (e.g., school placement). It is interesting that this pattern did not hold for females, 2-year schools, or for the discipline areas of Liberal Arts and Health Professions. These co-op graduates rely heavily on outside school sources for finding their first job, which is a commentary on the job placement activities of 2-year schools and the types of co-op jobs female students are assigned in Liberal Arts and Health Professions.

The examination of the co-op experience relative to career plans indicates that co-op participation provides first jobs which are more relevant to the college experience, and co-op participation continues to lead to a better match of college experience and job requirements after a few years. A more definitive examination of this issue must await the findings of Chapter 5, but it is also clear from the limited analysis of this section that cooperative education may be a successful device to further career education goals. After a few years, co-op graduates view their current jobs as significantly more related to their career plans than non-co-op graduates.

Caution must be exercised with regard to these conclusions, however, in the case of 2-year Liberal Arts and Health Professions programs which are typically attended by the female graduates. The findings with respect to these strata indicate that co-op education does not fulfill career plans anymore than does non-co-op education, and, in fact, may indicate a tendency for the opposite to be taking place. Certainly, this question bears further examination.

Finally, the rate of career advancement, as measured by recorded salary increases, was considered. Many statistically significant differences were found by different levels of stratification, but three distinct patterns are evident. The first is that previous experience pays off in terms of larger salary increases, even though it may not always pay off in terms of starting salaries (i.e., over that of co-op participation, for example). The second is that, within levels of previous experience, the tendency is generally to have salaries grow so as to narrow starting salary differentials. The third is that no systematic pattern of greater salary growth by co-op participants than by non-co-op participants is apparent, so that those initial salary differentials tend to be maintained (or, at least, don't show a significant tendency to either converge or diverge).

II. ANALYSIS OF STUDENT COSTS AND BENEFITS

Introduction

The purpose of this section is to consider in detail the costs and benefits incurred by the postsecondary education student with particular attention to differences attributable to the student's co-op status. Many of these costs and benefits were already included as elements in the rate of return analysis of Section I, but Section II will explicitly describe the differences in these costs and benefits as varying student and school-specific characteristics are considered. Section II will deal with the student experience in much the same manner as the Additional Graduate Analysis of Section I dealt with the graduate experience. For example, it has already been determined in Section I that differences in graduate earnings and employment experiences explain a large part of the differences found in the rates of return to college education. Section II will determine whether student costs and benefits are also determining factors in these rate of return differences. That is, student costs and benefits will be tabulated and analyzed according to the cohort determining variables of the rate of return analysis. Specifically, some of the questions to be answered are:

- What are the individual cost and benefit items for co-op and non-co-op students, and how do these items vary with respect to other student and school-specific variables?
- How do co-op earnings compare with other sources of student income?

Differentials in costs and benefits as other area and school specific variables change will then be calculated and analyzed. Some of the questions pertaining to these additional variables are:

- Do race or veteran status affect student costs and benefits? Additionally, are these variables highly correlated with other factors which affect student costs and benefits, such as program length or discipline area?

- Does school ownership (public versus private) affect student costs and benefits? Are there any other school-specific variables which affect student costs and benefits?

Lastly, the attitude of students toward their college education and employment as students will be examined in order to measure some of the non-pecuniary costs and benefits associated with alternative student and institutional characteristics. That is, the question will be asked:

- How do co-op status and other student and institutional characteristics affect the students' attitudes toward their education and college jobs?

To address these questions in as precise a manner as possible, Section II is divided into five subsections. Subsection A is an analysis of student costs and benefits as they are used in the rate of return analysis in an attempt to partially describe the results of the rate of return analysis. Subsection B is a further analysis of student costs as they are affected by other student and school-specific variables. Subsection C will follow a similar analysis for student benefits. Subsection D will explore the effects of co-op status and other student and institutional characteristics upon student attitudes toward their education and college jobs. Finally, a summary of the analysis of student costs and benefits will follow these analyses in Subsection E. The reader is referred to this last subsection for a brief but comprehensive overview of the findings of this section.

A. Analysis of Rate of Return Variables and Sample Selection

- Part 1 will consider variations in student costs and benefits across the cohort-definition variables of the rate of return analysis (co-op status, sex, discipline area, and program length). For this analysis, the same sample of student data will be used as was used in the rate of return analysis. This is to determine the extent to which trends in student costs and benefits contribute to the rate of return results, as was found to be the case for the graduate experience.

- Part 2 will define additional sets of student data and compare these with that used in the rate of return analysis. This comparison is in preparation for Subsection B, where the impact of additional variables on student costs and benefits are considered. For this analysis, as with the Additional Graduate Analysis, it is desirable to increase the size of the student sample, if possible.

1. Student Costs and Benefits by Rate of Return Variables

It has been determined above that the pattern established by the rate of return analyses is consistent with the findings with respect to graduate earnings and labor force participation and are in part explained by them. This effort is to make the same type of comparison with respect to the student experience. It will be recalled that there were several student cost and benefit elements which were defined for inclusion in the cohort-specific net benefit streams. Those elements to be examined in this analysis are:[1]

- student costs (books, tools, supplies);
- tuition;
- student taxable earnings; and
- student non-taxable income.

The means for each of these variables were calculated according to each of the cohort-determining attributes and are presented in Table 2.35. In addition, a net income figure for students was calculated by subtracting student costs and tuition from the student incomes with the resulting mean presented in Table 2.35. Several results are apparent which are consistent with the rate of return findings:

- Male students have significantly higher net incomes than female students, due largely to taxable earnings differences.
- Five-year programs provide significantly higher annual student net incomes than 4-year programs, and both provide significantly higher student net incomes per year than 2-year programs. This pattern holds for every net income subcomponent, except for tuition where 4-year programs have the highest per-year values.

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[1] These elements specifically exclude food, housing, and transportation costs. The reader is referred to Section I for a detailed discussion of the reasons.

TABLE 2.35: ANNUAL MEAN STUDENT COSTS AND BENEFITS BY COOPERATIVE STATUS AND RATE OF RETURN VARIABLES[1]

	STUDENT CHARACTERISTICS		TUITION		COSTS[2]		TAXABLE EARNINGS		NON-TAXABLE INCOME		STUDENT NET INCOME	
			Number	Mean	Number	Mean	Number	Mean	Number	Mean	Number	Mean
TOTAL	Sex:	Male	863	999	863	365	872	2281	871	732	865	1681
		Female	610	796	610	344	617	1210	616	705	609	799
	Program Length:	2-Year	627	367	627	291	635	1416	634	450	626	1232
		4-Year	674	1360	674	371	682	1728	681	965	673	985
		5-Year	175	1128	175	507	175	3748	175	779	175	2893
	Discipline Area:											
	Engineering & Architecture		340	1111	340	456	341	2980	341	796	342	2198
	Business & Management		482	829	482	305	488	1775	487	616	482	1270
	Health Professions		150	787	150	288	150	754	150	767	150	457
	Liberal Arts		307	1058	307	353	312	1254	311	892	306	778
	Trade & Industrial		123	532	123	340	125	1600	125	523	123	1335
CO-OP	Total Co-op:		651	844	657	400	657	2669	657	620	651	2076
	Sex:	Male	414	964	414	400	415	3187	415	629	414	2462
		Female	237	634	237	401	242	1781	242	603	237	1402
	Program Length:	2-Year	256	352	256	318	260	1835	260	368	256	1568
		4-Year	220	1191	220	408	222	2796	222	788	220	2017
		5-Year	175	1128	175	507	175	3748	175	779	175	2893
	Discipline Area:											
	Engineering & Architecture		246	1078	246	467	247	3499	247	726	246	2697
	Business & Management		207	823	207	302	208	2327	208	550	206	1783
	Health Professions		27	479	27	255	28	1065	28	703	28	1022
	Liberal Arts		105	603	105	440	106	1766	106	566	105	1310
	Trade & Industrial		34	512	34	357	35	2395	35	635	34	2251
NON-CO-OP	Total Non-Co-op:		825	964	825	317	835	1173	833	806	823	716
	Sex:	Male	449	1013	449	333	460	1447	459	830	451	964
		Female	373	899	373	309	375	837	374	776	372	415
	Program Length:	2-Year	371	378	371	272	375	1125	374	506	370	1000
		4-Year	454	1443	454	353	460	1212	459	1050	453	484
	Discipline Area:											
	Engineering & Architecture		94	1195	94	426	96	1571	96	986	96	921
	Business & Management		275	834	275	308	281	1349	280	661	276	888
	Health Professions		123	854	123	295	122	679	122	781	122	328
	Liberal Arts		202	1295	202	307	206	1000	205	1072	201	500
	Trade & Industrial		89	540	89	334	90	1295	90	528	89	985

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[1] Annual mean costs and benefits are in 1976 dollars.

[2] Includes books, tools, supplies, etc. but specifically excludes transportation, food, and housing.

- Engineering & Architecture provides the largest annual student net incomes, while Liberal Arts and Health Professions predictably provide the lowest annual net incomes. These differences were due largely to variations in both taxable student earnings and tuitions.
- There were significant co-op/non-co-op differences found for all student cost and income components prior to stratification, but these differences were not always maintained when stratified by cohort identifiers. Females, 4-year students, Health Professions, and Liberal Arts cohorts had significantly lower tuitions for co-op. Males and Liberal Arts cohorts had significantly higher student costs than corresponding non-co-op students. Males, 2-year, 4-year, and Liberal Arts cohorts exhibited significantly lower non-taxable incomes for co-op students than for non-co-op students. The most significant result in Table 2.35, however, is that taxable earnings were significantly higher (at a 95% level of confidence) for every co-op category than for the corresponding non-co-op category. As a result, co-op net income figures were significantly higher than those for non-co-op.

It is clear that these findings support the earlier rate of return findings so that both the student and the graduate experiences are consistent with the rate of return calculations. In addition, the student co-op/non-co-op comparisons indicate quite clearly that the co-op program is an effective student aid device. While some variance was found in student costs, tuition, and non-taxable student incomes, the favorable differentials in student net income between co-op and non-co-op are directly attributable to differences in taxable student earnings; i.e., co-op student earnings. Thus, regardless of sex, program length, or discipline area, co-op programs provide an important financial aid device for the participant.

2. Sample Selection for Student Analysis

Student experiences are affected by characteristics other than those which defined the cohorts in the rate of return analysis. Examination of the impact of these additional characteristics upon student experiences could only be conducted using those individuals who were included in the rate of return analysis. As was the case for the Additional Graduate Analysis of Section I, however, it would be beneficial if this student sample were augmented for further analysis. Therefore, an examination was made of individual records which were previously excluded from the rate of return analysis. The rate of return sample with respect to students was identified and defined as follows:

- As described in the Technical Notes to Chapter 2, consistent responses were required for questions 20 through 24 in the student questionnaire, because these were used to compute the student costs and benefits necessary to construct the student experience portion of the cohort net benefit streams.
- The student's age had to be within reasonable limits relative to his/her year in school, and consistent with the age span requirements for graduates as previously described: 17-20 years of age for the first school year; 18-21 years of age for the second school year; etc.
- A portion of the student data was received from schools from which no corresponding graduate data were available (generally schools where new programs had been instituted). As the rate of return analysis required cost and benefits histories for students and graduates which were consistent by school, student data from these schools were not used in the rate of return analysis.

Any student data record which met the above criteria was used in the rate of return analysis. The aggregation of these records will be known as the student Rate of Return Sample.

The second sample was defined by the following criterion:

- elimination from the Rate of Return Sample because student ages were above the year-in-school limits.

These students were deemed to have had some form of previous experience and were defined as the student Previous Experience Sample.

The third and final sample was defined by the following criteria:

- elimination from the Rate of Return Sample due to attendance at a school from which no corresponding graduate data were obtained; and
- non-inclusion in the Previous Experience Sample.

This sample will be known as the Missing Graduate Data Sample.

If it could be shown that the Previous Experience Sample and/or the Missing Graduate Data Sample were statistically equivalent to the Rate of Return Sample, two or more of these samples could be pooled with the student Rate of Return Sample for the analysis of other variables. On the other hand, consistently different responses between samples would preclude sample pooling and would suggest that independent analyses be conducted on the separate samples.

In order to determine the extent to which the various samples could be pooled, tabulations were conducted for nine separate cost and benefit categories (tuition, travel, other costs, school time, work time, co-op earnings, non-co-op earnings, G.I. benefits, and transfer payments) according to each sample and by level of unemployment, region, race, and school ownership. In almost every instance, tabulations from the Previous Experience Sample resulted in significantly different means from those indicated by tabulating the Rate of Return Sample. Therefore, as was the case with the graduate data, the student analysis must maintain the Previous Experience Sample separate from the rest of the analysis. Surprisingly, moreover, selected cost and benefit items from the Missing Graduate Data Sample exhibited significantly different means (at a 95% level of confidence) from those produced by the Rate of Return Sample.

Table 2.36 presents the means, for both the Rate of Return Sample and the Missing Graduate Data Sample, of those selected variables for which significant differences were found. The variables are tuition, time spent in school, work, time spent at a job, and co-op earnings. In about every instance, the differences between the corresponding sample means were significant at a 95 percent level of confidence.

TABLE 2.36: MEAN ANNUAL STUDENT TUITION AND CO-OP EARNINGS AND MEAN WEEKLY TIME BY STUDENT AND SCHOOL CHARACTERISTICS AND BY SAMPLE[1]

SAMPLE	SCHOOL AND STUDENT CHARACTERISTICS	TUITION		SCHOOL TIME		WORK TIME		CO-OP EARNINGS	
		Number	Mean	Number	Mean	Number	Mean	Number	Mean
Rate of Return	Unemployment: High	795	901	794	39.5	794	11.9	802	968
	Low	681	923	681	39.4	682	13.5	690	742
	Region: East	1203	1045	1188	39.9	1199	12.1	1211	960
	West	273	320	277	37.4	277	14.8	281	449
	Race: White	1232	937	1233	39.0	1233	12.7	1242	847
	Non-White	226	782	226	41.7	227	12.7	232	984
	Ownership: Public	1064	466	1064	38.4	1065	14.6	1080	564
	Private	412	2059	411	42.0	411	7.6	412	1650
Missing Graduate Data	Unemployment: High	287	797	285	33.8	287	14.5	290	603
	Low	294	611	295	32.9	296	15.4	301	999
	Region: East	548	681	546	33.4	549	14.6	557	782
	West	33	1057	34	32.9	34	22.0	34	1177
	Race: White	474	696	474	34.6	477	15.5	481	841
	Non-White	99	735	100	28.3	100	11.9	102	643
	Ownership: Public	476	506	474	33.0	477	15.0	482	811
	Private	105	1596	106	35.2	106	14.9	109	777

[1] Annual mean tuition and co-op earnings are in 1976 dollars; mean time is expressed in hours per week.

Given the findings presented in Table 2.36, one is inclined to reject the pooling of the Rate of Return and Missing Graduate Data Samples. On the other hand, the differences in Table 2.36 could be due to factors not associated with sample selection. For example, the differences in co-op earnings could be due to differing proportions of co-op students in the two samples, and one could hardly reject pooling the samples on this basis. Therefore, Table 2.36 was tabulated again for co-op and non-copop separately. Unfortunately, only the tuition differences between samples were "explained" by the co-op status of the student.

Other tabulations by discipline area or by program length may account for, or explain, the between sample differences on Table 2.36, but, even if this were the case and the samples were pooled, the analyses of the remainder of this section would have to be stratified by those variables. It is actually easier not to pool the samples and to conduct separate analyses on each sample than to try to maintain the strata necessary to account for between sample differences.

Having decided to retain the three sample distinctions, Table 2.37 provides a more detailed comparison of the Rate of Return Sample and the Missing Graduate Data Sample. Most striking is the finding that over ten times the proportion of the latter are from schools with new programs. Equally interesting is that the difference between the samples is due both to the differences in the distribution of co-op students and the differences in distribution of non-co-op students. As expected, the Missing Graduate Data Sample contains proportionally more co-op students from IV-D-funded schools and schools that have voluntary co-op programs (both typically new programs). Also, as expected, the Missing Graduate Data Sample had higher proportions of Liberal Arts and Business & Administration students and female students. The high proportion of co-op females explains the lower proportion of the typically male Engineering & Architecture programs.

TABLE 2.37: SELECTED PERCENTAGE COMPARISONS OF THE RATE OF RETURN AND THE MISSING GRADUATE DATA SAMPLE OBSERVATIONS[1]

		SAMPLES	
	CHARACTERISTICS	MISSING GRADUATE DATA	RATE OF RETURN
	New Co-op Programs	62.3	5.8
CO-OP	IV-D Funding	84.1	64.2
	Low Unemployment	54.4	42.6
	Non-Mandatory Programs	98.0	53.8
	South	57.1	36.5
	Business & Administration	48.8	33.3
	Liberal Arts	26.6	17.0
	Engineering & Architecture	20.1	39.6
	Female	46.6	36.8
NON-CO-OP	Co-op School	5.6	51.0
	East	39.2	17.7
	Business & Administration	61.2	35.3
	Female	38.3	44.9
	Public	83.5	71.1
	Non-White	17.1	12.1

[1] All figures are percentages; only sample differences significant at a 95 percent level of confidence are presented.

Non-co-op students in the Missing Graduate Data Sample are about all from schools without co-op programs (whereas, about half of the students in the Rate of Return Sample are from such schools). Some of these students are White or female, but more are in public schools, Eastern schools, and Business & Administration programs. Clearly, it is best to retain the three sample distinctions rather than pooling any two of them. It will be interesting to follow the results from the Missing Graduate Data Sample, because, being from new programs, they may indicate future cost-benefit (and rate of return) relationships among the strata (cohorts).

B. Student Costs

Each of several separate measures of direct out-of-pocket (dollars) and time costs for students are examined in this section. Direct costs include tuition, books, housing, food, and tools. Time costs include both time in school (i.e., the sum of classroom time, study time, and lab time) and time devoted to work. Comparisons were conducted for each of these variables by a number of different strata. These strata included unemployment level, region, race, ownership class of the school (i.e., public or private), veteran status, additive credit, and IV-D funding for each co-op status/ sample combination. Tabulations were not conducted by the rate of return cohort characteristics because of the information already supplied by Table 2.35 above, unless specifically called for in the project analysis plan.

The first student cost item to be examined is tuition. Table 2.38 shows a high degree of variation in tuition. There are always significant differences in tuition among regions and ownership categories (private is higher) regardless of the co-op status or the sample, and between unemployment levels for all but co-op participants with previous experience for non-co-op participants. No significant differences using an F-test at a 95 percent level of confidence were observed by veteran status or race, regardless of sample or co-op status. Schools with IV-D funding charge significantly

TABLE 2.38: ANNUAL MEAN TUITION COSTS BY SELECTED CHARACTERISTICS FOR EACH CO-OP STATUS/SAMPLE COMBINATION[1]

	CHARACTERISTICS		SAMPLE					
			RATE OF RETURN		MISSING GRADUATE DATA		PREVIOUS EXPERIENCE	
			Number	Mean	Number	Mean	Number	Mean
CO-OP	Total		651	844	251	749	421)	418
	Unemployment:	High	375	903	115	864	218	392
		Low	276	764	136	652	203	446
	Region:	Northeast	176	887	72	1504	80	766
		North Central	125	1597	21	467	46	350
		South	239	642	144	377	144	386
		West	111	362	14	1115	151	283
	Race:	White	513	875	204	763	321	391
		Non-White	130	741	44	665	96	484
	Ownership:	Public	480	502	199	520	394	309
		Private	171	1804	52	1624	27	2008
	Veteran:	Yes	5	890	0	--	241	367
		No	641	841	249	744	180	456
	IV-D Funding:	Yes	418	890	209	690	302	453
		No	233	761	42	1041	119	328
	Non-Additive Credit:	Yes	577	887	184	830	361	432
		No	42	416	59	542	53	319
NON-CO-OP	Total		825	964	330	668	695	430
	Unemployment:	High	420	899	172	752	359	421
		Low	405	1031	158	575	336	441
	Region:	Northeast	147	1167	98	1049	143	692
		North Central	131	1414	61	553	115	384
		South	385	1017	152	465	269	432
		West	162	290	19	1014	168	236
	Race:	White	719	981	270	645	554	435
		Non-White	96	838	55	791	130	431
	Ownership:	Public	584	437	277	495	634	322
		Private	241	2241	53	1567	61	1548
	Veteran:	Yes	8	408	0	--	313	408
		No	812	971	327	669	378	449

[1] Annual mean tuition costs are expressed in 1976 dollars.

higher tuitions to co-op students, except for those in the Missing Graduate Data Sample where the tuitions are significantly lower for students in IV-D schools. Finally, schools with non-additive credit[1] charge higher tuitions to co-op students, significantly so in all but the Previous Experience Sample.

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[1] Non-additive credit for a co-op student means that credit is received for time spent in co-op employment without a concomitant increase in the number of credits needed for graduation.

The regional variations are most certainly due to variations in the representation of schools by discipline area and by ownership category. This is also the explanation for the variations observed between schools (or students) located in high or low unemployment areas. The ownership difference, of course, was expected, and the high tuition for students in non-additive credit programs may represent the necessity of paying full tuition while working at a co-op job in these schools.

From Table 2.38, it is clear that maintaining these separate samples was justified. In total, the mean tuition for both co-op and non-co-op was significantly lower for those with previous experience (a reflection of school and discipline area choice), and non-co-op students in the Missing Graduate Data Sample paid mean tuitions significantly lower than for those non-co-op students in the Rate of Return Sample. This same pattern generally was true for comparisons by each of the individual characteristics.

Comparisons of co-op and non-co-op mean tuitions indicates significant differences in about every instance within the Rate of Return Sample, but seldom elsewhere. Looking at the significant co-op/non-co-op differences, Table 2.38 shows higher tuitions for non-co-op students in low unemployment areas, the Northeast, the South, private schools, and for non-veterans in the Rate of Return Sample; and lower tuitions for students attending public schools in the Rate of Return Sample, students in the Northeast in the Missing Graduate Data Sample, and students attending private schools with previous experience.

In many ways the comparisons of mean pecuniary costs (non-tuition) presented on Table 2.39 are similar to those in Table 2.38 but in other ways new patterns are established. As in Table 2.38, the three samples do provide significantly different results. That is, those with previous experience consistently have significantly higher non-tuition costs than either of the other two samples (thereby compensating for the generally lower tuition costs) probably

TABLE 2.39: ANNUAL MEAN OTHER SCHOOL COSTS BY SELECTED CHARACTERISTICS FOR EACH CO-OP STATUS/SAMPLE COMBINATION[1]

	CHARACTERISTICS		SAMPLE					
			RATE OF RETURN		MISSING GRADUATE DATA		PREVIOUS EXPERIENCE	
			Number	Mean	Number	Mean	Number	Mean
CO-OP	Total		651	1690	231	1753	421	2916
	Unemployment:	High	375	1820	115	1577	218	3066
		Low	276	1512	136	1902	203	2755
	Region:	Northeast	176	2031	72	1782	80	2888
		North Central	125	1504	21	1642	46	2173
		South	239	1506	144	1758	144	2705
		West	111	1753	14	1721	151	3359
	Race:	White	513	1707	204	1891	321	3024
		Non-White	130	741	44	1176	96	2614
	Ownership:	Public	480	1507	199	1795	394	2893
		Private	171	2202	52	1594	27	3257
	Veteran:	Yes	5	1615	0	--	241	3048
		No	641	1691	249	1757	180	2739
	IV-D Funding:	Yes	418	1679	209	1750	302	2884
		No	233	1709	42	1766	119	2999
	Non-Additive Credit:	Yes	577	1716	184	1721	361	2983
		No	42	1044	59	1908	53	2472
NON-CO-OP	Total		825	1355	330	1423	695	2461
	Unemployment:	High	420	1391	172	1387	359	2678
		Low	405	1318	158	1464	336	2229
	Region:	Northeast	147	1357	98	1643	143	2693
		North Central	131	1564	61	931	115	1297
		South	385	1279	152	1475	269	2438
		West	162	1357	19	1461	168	2480
	Race:	White	719	1365	270	1512	554	2572
		Non-White	96	838	55	1041	130	1922
	Ownership:	Public	584	1278	277	1470	634	2446
		Private	241	1542	53	1182	61	2606
	Veteran:	Yes	8	1470	0	--	313	2825
		No	812	1359	327	1422	378	2173

[1] Annual mean other school costs are the sum of annual expenditures on food, housing, books, and tools; exclude transportation costs because of the high degree of variability in the reported data; and are expressed in 1976 dollars.

as a result of family responsibilities, etc. On the other hand, the other two samples exhibit fairly similar mean costs with very few significant differences.

Those significant differences that do show up between the two samples with no previous experience are due to significant differences in individual characteristics. For example, significant racial differences appear for the first time, with Whites in all cases having higher non-tuition costs (significantly so for co-op students in the Missing Graduate Data Sample and non-co-op students in all but the Rate of Return Sample). Generally, however, Table 2.39 is notable for the absence of significant differences by individual characteristics. In fact, no such differences are noted for the co-op students with previous experience, where non-tuition costs are uniformly high. As opposed to the findings for tuition costs, the non-tuition costs for co-op students did not vary significantly by the IV-D funding status of the school attended. Only in the Rate of Return Sample are ownership differences significant, with private school costs the higher; and, while unemployment level differences are significant for co-op students with no previous experience, the rankings are reversed between the two no-previous-experience samples.

Finally, in virtually every co-op/non-co-op comparison for the Rate of Return Sample, co-op students faced significantly higher non-tuition costs. In both the Previous Experience Sample and the Missing Graduate Data Sample, co-op students also faced higher non-tuition costs in every case, but significantly so in less than half of the comparisons. It is interesting to note that the differences within these last two samples were not significant by region, but were significant for low employment areas, Whites, and public schools.

The remaining two tables concerning student costs are directed toward time spent on school-related activities and work-related activities, respectively. Table 2.40 describes the former. In this table, there are four significant differences by individual characteristics. For example, co-op students in the Rate of Return Sample exhibit significantly fewer weekly hours of school time if they are White and attending public schools, are enrolled in schools with non-additive credit, or in schools located in low employment areas. Each of these has plausible explanations. Whites historically have had better high school training and the effort to open colleges to non-Whites undoubtedly has included many without adequate backgrounds and therefore has necessitated more weekly study and class time in

TABLE 2.40: MEAN WEEKLY SCHOOL TIME BY SELECTED CHARACTERISTICS FOR EACH CO-OP STATUS/SAMPLE COMBINATION[1/]

	CHARACTERISTICS		SAMPLE					
			RATE OF RETURN		MISSING GRADUATE DATA		PREVIOUS EXPERIENCE	
			Number	Mean	Number	Mean	Number	Mean
CO-OP	Total		649	41.2	251	32.4	429	31.6
	Unemployment:	High	375	42.7	114	32.4	220	32.5
		Low	274	39.0	137	32.3	209	30.7
	Region:	Northeast	176	41.3	72	34.8	82	32.0
		North Central	125	41.7	22	28.4	50	28.4
		South	235	42.2	143	31.3	145	33.3
		West	113	38.2	14	37.1	152	30.8
	Race:	White	514	40.4	203	34.2	98	31.2
		Non-White	128	44.5	45	24.5	327	32.4
	Ownership:	Public	478	39.7	198	32.8	402	30.8
		Private	171	45.3	53	30.7	27	43.6
	Veteran:	Yes	5	41.0	0	--	249	28.5
		No	639	41.1	249	32.3	180	35.8
	IV-D Funding:	Yes	416	40.8	209	32.0	307	31.8
		No	233	41.8	42	34.0	122	31.2
	Non-Additive Credit:	Yes	577	41.0	185	31.4	364	32.3
		No	40	46.9	58	34.9	57	26.1
NON-CO-OP	Total		826	38.0	329	34.1	706	33.0
	Unemployment:	High	419	36.5	171	34.7	361	31.9
		Low	407	39.6	158	33.5	345	34.3
	Region:	Northeast	144	32.0	95	36.4	143	33.3
		North Central	133	39.6	63	31.0	118	29.8
		South	385	40.3	151	34.6	275	35.4
		West	164	36.8	20	29.9	170	31.2
	Race:	White	719	38.1	271	34.8	561	33.0
		Non-White	98	38.2	55	31.4	134	32.7
	Ownership:	Public	586	37.4	276	33.1	645	33.0
		Private	240	39.6	53	39.7	61	33.9
	Veteran:	Yes	8	34.8	1	40.0	322	32.0
		No	813	38.1	326	34.1	380	33.9

[1/] Mean weekly school time is the sum of weekly hours attending class, studying, and attending labs.

order to catch up. Public schools may be less academically demanding, and those students in low employment areas may be spending more time in work-related activities to the detriment of school-related activities. Finally, non-additive credit schools may substitute co-op employment for some of the usual lab work associated with the curriculum.

For co-op students in the Missing Graduate Data Sample, Whites have significantly higher school time than non-Whites which runs counter to the effect described above. It will be shown below, however, that work time for these students is less than for non-Whites. Those co-op students with previous experience, those in public schools, and veterans spend significantly fewer hours at school-related activities, although co-op students in non-additive credit schools spend significantly more time at school.

For non-co-op students, significant regional differences are indicated in all but the Missing Graduate Data Sample, whereas non-co-op students in the Rate of Return Sample spend significantly more hours at school if it is located in a low employment area (the opposite from that found for corresponding co-op students) and non-co-op students in the Missing Graduate Data Sample exhibited the expected fewer weekly school hours in public schools.

Table 2.40 again indicates the necessity for not pooling the Missing Graduate Data Sample with the Rate of Return Sample. As opposed to previous findings, the mean weekly school hours reported for each category is closest to that in the Previous Experience Sample than that in the Rate of Return Sample. Of course, observations in the Previous Experience Sample consistently differ significantly from those in the Rate of Return Sample, but almost every Missing Graduate Data Sample observation is also significantly different from that in the Rate of Return Sample, while very few are significantly different from the Previous Experience Sample. In fact, such differences occur for co-op students only in the case of non-Whites, private schools, non-veterans, schools with additive credit, and for non-co-op student veterans. This pattern is reflected in the sample totals, where for both co-op and non-co-op students, Previous Experience and Missing Graduate Data Samples are not significantly different, but both are significantly different from the Rate of Return Sample.

Finally, co-op/non-co-op differences of a significant nature are frequently found within the Rate of Return Sample but seldom in the other two samples. The only total sample difference is found in the Rate of Return Sample where non-co-op students spend significantly fewer hours in school work. In the same sample non-co-op students including non-veterans or Whites spend fewer weekly hours at school in high unemployment areas, in the Northeast, in either public or private schools. Non-co-op students in the Missing Graduate Data Sample have significantly higher hours if they are non-White or attend private schools. Co-op/non-co-op comparisons in the Previous Experience Sample show significantly higher weekly school hours for non-co-op veterans or if the school is located in low unemployment areas, but significantly lower hours if attending a private school.

Turning to hours spent at work, as shown in Table 2.41 provides some interesting comparisons with Table 2.40. Generally, the relationship observed within each characteristic on Table 2.40 is reversed on Table 2.41. This means that, even though not all of these differences are significant at the 95 percent level of confidence, activities at the expense of fewer weekly hours at work, and vice versa involve definite tradeoffs.

This tradeoff is exemplified by the significantly lower work hours of non-co-op students in each sample as opposed to two out of three samples exhibiting the reverse for school hours. In fact, every one of the significant co-op/non-co-op differences on Table 2.41 indicates lower non-co-op work hours. These differences are low unemployment, South, West, White, public, and non-veteran for the Rate of Return Sample; high unemployment, South, White, public, and non-veteran for the Missing Graduate Data Sample; and high and low unemployment, South, West, White, public and both veteran statuses for the Previous Experience Sample.

Examination of characteristic differences within samples and co-op status, however, reveals few significant differences. Some significant differences are observed among regions for co-op students in all three samples, but this is the only consistent finding. Non-co-op students spend significantly more weekly work time if they are attending public schools than if they are attending private schools and if they qualify for the Rate of Return Sample. Significant regional differences are observed for non-co-op students in the Missing Graduate Data Sample, and these same students work significantly

TABLE 2.41: MEAN WEEKLY STUDENT WORK TIME BY SELECTED CHARACTERISTICS FOR EACH CO-OP STATUS/SAMPLE COMBINATION[1]

	CHARACTERISTICS		SAMPLE					
			RATE OF RETURN		MISSING GRADUATE DATA		PREVIOUS EXPERIENCE	
			Number	Mean	Number	Mean	Number	Mean
CO-OP	Total		650	13.5	252	17.2	429	29.6
	Unemployment:	High	375	11.4	115	18.6	220	30.4
		Low	275	16.4	137	16.0	209	28.8
	Region:	Northeast	176	11.0	72	13.6	82	22.9
		North Central	125	12.0	22	20.9	50	30.7
		South	236	14.3	144	17.9	145	27.1
		West	113	17.6	14	22.9	152	35.2
	Race:	White	514	13.8	204	17.6	327	30.7
		Non-White	129	12.8	45	14.3	98	25.8
	Ownership:	Public	479	16.0	199	17.7	402	30.2
		Private	171	6.5	53	15.2	27	21.2
	Veteran:	Yes	5	13.4	0	--	249	34.6
		No	640	13.6	250	17.2	180	22.7
	IV-D Funding:	Yes	417	14.1	210	18.3	307	29.2
		No	233	12.5	42	11.4	122	30.6
	Non-Additive Credit:	Yes	577	13.5	185	15.6	364	29.4
		No	40	13.3	59	21.8	57	32.6
NON-CO-OP	Total		826	11.9	331	13.3	705	21.3
	Unemployment:	High	419	12.4	172	11.8	360	21.1
		Low	407	11.4	159	15.0	345	21.5
	Region:	Northeast	144	13.9	96	12.3	143	18.7
		North Central	133	10.8	63	15.4	118	29.5
		South	385	11.2	152	12.0	275	18.8
		West	164	12.9	20	21.5	169	21.6
	Race:	White	719	11.9	273	14.0	560	21.1
		Non-White	98	12.7	55	9.9	134	21.0
	Ownership:	Public	586	13.4	278	13.1	644	21.5
		Private	240	8.3	53	14.7	61	19.2
	Veteran:	Yes	8	8.3	1	25.0	321	27.0
		No	813	12.0	328	13.4	380	16.5

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[1] Work time is composed of mean weekly hours spent at all work.

less when in high unemployment areas. IV-D funding and additive credit are associated with significantly more hours of work for co-op students in the Missing Graduate Data Sample, but not elsewhere. For co-op students with previous experience, the characteristic of White, public school, and veteran status indicates significantly higher weekly hours of work, whereas non-co-op students with previous experience exhibit significantly higher hours of work only if they are veterans.

Lastly, Table 2.41 confirms the maintenance of three separate samples. In almost every instance on Table 2.41, the observations of each sample are significantly different from the other two, with the general trend being the lowest weekly hours of work associated with the Rate of Return Sample and the highest hours associated with the Previous Experience Sample. That the latter is the highest is consistent with the stronger ties to the job market and the necessity to exercise those ties due to the high school expenses as shown in Table 2.39 above.

Before turning to student benefits, it is appropriate to briefly summarize the results with respect to student costs. Many (but not all) of the findings for tuition were expected (e.g., the fact that private schools have higher tuition than public schools). It was interesting to note that those students with previous experience consistently chose schools with lower tuition. At the same time, students with previous experience incurred significantly higher non-tuition costs, particularly those who were co-op students. In fact, all co-op student samples indicated higher non-tuition costs than non-co-op students.

Comparisons of time costs indicate that a definite tradeoff exists between school time and work time, so that, while students without previous experience spend considerably more time in school-related activities (both co-op and non-co-op), they spend considerably less time at work (both co-op and non-co-op). This time tradeoff holds for virtually every stratum. Other than for tuition, the presence of IV-D funding seldom influenced the cost and time items. Finally, the decision to maintain three separate samples was validated by the persistent differences exhibited among them.

C. Student Benefits

Table 2.42 presents student earnings not related to co-op employment. In about every instance, these earnings are significantly larger for non-co-op than for co-op students. At the same time, it is nearly universally the case that those with previous experience

TABLE 2.42: ANNUAL MEAN NON-CO-OP STUDENT EARNINGS BY SELECTED CHARACTERISTICS FOR EACH CO-OP STATUS/SAMPLE COMBINATION[1]

	CHARACTERISTICS		SAMPLE					
			RATE OF RETURN		MISSING GRADUATE DATA		PREVIOUS EXPERIENCE	
			Number	Mean	Number	Mean	Number	Mean
CO-OP	Total		657	773	252	813	431	435
	Unemployment:	High	377	753	115	815	221	422
		Low	280	799	137	811	210	449
	Region:	Northeast	176	807	72	1135	82	449
		North Central	127	589	22	1294	50	708
		South	240	743	144	561	146	329
		West	114	986	14	996	153	438
	Race:	White	517	824	204	878	328	440
		Non-White	132	591	45	377	99	415
	Ownership:	Public	486	931	199	768	404	390
		Private	171	323	53	983	27	1110
	Veteran:	Yes	5	980	0	--	250	381
		No	647	777	250	806	181	509
	IV-D Funding:	Yes	422	843	210	807	309	489
		No	235	646	42	844	122	296
	Non-Additive Credit:	Yes	582	798	185	749	366	599
		No	42	708	59	1025	57	418
NON-CO-OP	Total		835	1173	339	1250	715	786
	Unemployment:	High	425	1221	175	1281	364	800
		Low	410	1123	164	1217	351	771
	Region:	Northeast	148	1459	99	1586	146	755
		North Central	133	1379	66	979	121	796
		South	387	994	154	1119	278	790
		West	167	1172	20	1487	170	799
	Race:	White	725	1207	277	1412	563	853
		Non-White	100	904	57	477	141	479
	Ownership:	Public	594	1141	283	1237	653	718
		Private	241	1251	56	1313	62	1502
	Veteran:	Yes	8	1680	1	3880	326	671
		No	822	1166	336	1241	385	892

[1] "Non-Co-op" in the title to this table refers to earnings from other than co-op employment; mean annual non-co-op earnings are expressed in 1976 dollars.

realize lower earnings than do those without previous experience. The first of these findings was expected because we have not yet considered earnings from employment, but the second is surprising in view of the greater non-tuition expenses of experienced students and their tendency to spend more time at work (see Table 2.39 and Table 2.41). This phenomenon will be explained by non-taxable income presented below.

In the meantime, however, it is interesting to note that Whites, in all but the case of co-op students with previous experience, have significantly higher non-co-op earnings than Non-Whites. At the same time, significant differences are present between ownership categories, with those co-op students in the Rate of Return Samples experiencing much higher non-co-op earnings in public schools, and those students with previous experience (both co-op and non-co-op) having lower non-co-op earnings in public schools.

Table 2.43 presents co-op earnings by student and school characteristics and sample. Clearly, the mean annual co-op earnings on this table are more than sufficient to compensate for the lower non-co-op earnings shown for co-op students on Table 2.42. Again, however, co-op students with previous experience demonstrate significantly lower co-op earnings, which parallels the findings for non-co-op earnings rather than reversing them. Thus, the discrepancy between the work time of these students and their earnings persists. The only explanation, in terms of taxable earnings, is that students with previous experience work at lower paying jobs and earn less total taxable earnings in spite of longer work hours.

Significant differences are observed among the regions in all samples, with North Central showing the lowest co-op earnings in the Missing Graduate Data Sample and the West showing the lowest in the other two samples. Co-op students in the Rate of Return Sample counter-balance the high non-co-op earnings in public schools by showing significantly higher co-op earnings in private schools. On the other hand, the pattern of higher non-co-op earnings in private schools for co-op students with previous experience is reinforced by higher co-op earnings in private schools for these students. The only other significant differences on Table 2.43 are the significantly higher co-op earnings for Rate of Return co-op students in schools with non-additive credit or without IV-D funding, the significantly higher earnings for all non-Rate of Return co-op students in low unemployment areas (as expected), and the significantly higher co-op earnings for co-op non-veterans with previous experience.

TABLE 2.43: ANNUAL MEAN STUDENT CO-OP EARNINGS BY SELECTED CHARACTERISTICS AND SAMPLE[1]

CHARACTERISTICS		SAMPLE					
		RATE OF RETURN		MISSING GRADUATE DATA		PREVIOUS EXPERIENCE	
		Number	Mean	Number	Mean	Number	Mean
Total		657	1897	252	1827	430	1260
Unemployment:	High	377	2018	115	1452	220	972
	Low	280	1734	137	2142	210	1561
Region:	Northeast	176	2383	72	1065	82	1516
	North Central	127	2278	22	1000	50	1036
	South	240	1748	144	2234	146	1776
	West	114	1033	14	2859	152	700
Race:	White	517	1661	204	1442	327	1280
	Non-White	132	1971	45	1911	99	1244
Ownership:	Public	486	1189	199	1893	403	1188
	Private	171	3907	53	1581	27	2333
Veteran:	Yes	5	1192	0	--	249	978
	No	647	1903	250	1828	181	1647
IV-D Funding:	Yes	422	1631	210	1911	308	1300
	No	235	2374	42	1406	122	1158
Non-Additive Credit:	Yes	582	1897	185	1878	365	1322
	No	42	1214	59	1619	57	843

[1] Tabulated for co-op students only; "Co-op" in the title to this table refers both to the student and to earnings derived from co-op employment; annual mean co-op earnings expressed in 1976 dollars.

Turning to non-taxable revenues, Table 2.44 presents the total of all student transfer payments. Included are grants, subsidies, and loan. Non-co-op students are shown to make up part of the taxable earnings differential caused by co-op earnings by experiencing somewhat greater transfer payments (significantly higher only for non-co-op Rate of Return Sample students, however). At the same time, however, those students (both co-op and non-co-op) with previous experience again have lower (in most cases, significantly lower) transfer than either of the other two samples of students. This serves to widen the revenue differential associated with previous experience. The final possibility of closing this differential lies with the examination of G.I. benefits.

Before doing so, however, there are several other notable findings from Table 2.44. The first is that significant differentials are again observed among the regions, with the lowest

TABLE 2.44: ANNUAL MEAN STUDENT TRANSFER PAYMENTS BY SELECTED CHARACTERISTICS FOR EACH CO-OP STATUS/SAMPLE COMBINATION[1/]

	CHARACTERISTICS		SAMPLE					
			RATE OF RETURN		MISSING GRADUATE DATA		PREVIOUS EXPERIENCE	
			Number	Mean	Number	Mean	Number	Mean
CO-OP	Total		657	446	252	472	431	239
	Unemployment:	High	377	416	115	630	221	192
		Low	280	486	137	340	210	288
	Region:	Northeast	176	461	72	1022	82	281
		North Central	127	531	22	554	50	219
		South	240	490	144	515	146	176
		West	114	236	14	444	153	281
	Race:	White	517	339	204	409	328	157
		Non-White	132	877	45	757	99	518
	Ownership:	Public	486	353	199	324	404	213
		Private	171	710	53	1028	27	619
	Veteran:	Yes	5	0	0	--	250	144
		No	647	449	250	467	181	370
	IV-D Funding:	Yes	422	485	210	462	309	261
		No	235	376	42	522	122	183
	Non-Additive Credit:	Yes	582	458	185	542	366	251
		No	42	456	59	284	57	178
NON-CO-OP	Total		834	573	339	371	714	319
	Unemployment:	High	425	524	175	379	363	336
		Low	409	624	164	364	351	301
	Region:	Northeast	148	593	99	414	145	423
		North Central	132	717	66	490	121	235
		South	387	641	154	264	278	342
		West	167	286	20	596	170	251
	Race:	White	724	561	277	322	563	310
		Non-White	100	654	57	642	140	355
	Ownership:	Public	593	344	283	292	653	274
		Private	241	1137	56	774	61	798
	Veteran:	Yes	8	392	1	0	325	180
		No	821	579	336	373	385	432

[1/] Annual mean transfer payments include grants, subsidies, and loans; and are expressed in 1976 dollars.

transfers generally associated with either the West or the South (North Central for non-co-op students with previous experience). Students in private schools have significantly higher transfer payments in every case, regardless of co-op status or sample, than students in public schools. Non-Whites always receive higher transfer payments than Whites, although not significantly so for non-co-op students in either the Rate of Return Sample or the

Previous Experiences Sample. Finally, non-veterans consistently receive higher transfer payments than veterans, significantly so for non-co-op students in either the Rate of Return Sample or the Previous Experience Sample.

Since over half of the Previous Experience Sample are veterans, this and earlier findings for veterans, as well as the findings for those students in the Previous Experience Sample, may be clarified by an examination of G.I. benefits. These benefits for the Previous Experience Sample are presented in Table 2.45. Clearly, G.I. benefits are the final revenue source needed to bring about parity in total revenues among the samples. In fact, the size of these annual benefits more than makes up the difference indicated by earnings and transfers and, in large part, covers the greater non-tuition expenses incurred by students with previous experience.

TABLE 2.45: ANNUAL MEAN STUDENT G.I. BENEFITS BY SELECTED CHARACTERISTICS AND CO-OP STATUS[1]

CHARACTERISTICS		CO-OP		NON-CO-OP		TOTAL	
		Number	Mean	Number	Mean	Number	Mean
Total		431	1454	715	1025	1146	1186
Unemployment:	High	221	1552	364	1036	585	1231
	Low	210	1352	351	1012	561	1139
Region:	Northeast	82	963	146	917	228	934
	North Central	50	1227	121	1059	171	1108
	South	146	1338	278	998	424	1115
	West	153	1903	170	1136	323	1499
Race:	White	328	1576	563	1110	891	1281
	Non-White	99	1071	141	678	240	840
Ownership:	Public	404	1450	653	1034	1057	1193
	Private	27	1516	62	928	89	1106
Veteran:	Yes	250	2493	326	2231	576	2345
	No	181	20	385	13	566	15
IV-D Funding:	Yes	309	1479				
	No	122	1392				
Non-Additive Credit:	Yes	366	1510				
	No	57	1130				

[1] Tabulations for Previous Experience Sample only; annual mean benefits are expressed in 1976 dollars.

This is most likely the case for co-op students with previous experience, because their G.I. benefits on the average are higher than those for non-co-op students. This is mainly due to a larger proportion of veterans in the co-op group, but the resulting differences are significant in all comparisons but Northeast and North Central. Finally, of particular note are the consistently significantly higher G.I. benefits for Whites than for Non-Whites, which may be a reflection of proportionally more White veterans.

In order to summarize the pecuniary cost and benefit items considered above, Table 2.46 was constructed by combining the findings of Tables 2.38, 2.39, 2.42, 2.43, 2.44, and 2.45.[1] All co-op students, regardless of sample experienced pecuniary benefits of earned and unearned income larger than the costs of tuition and other costs. This was not the case for non-co-op students, however. Clearly, the non-co-op student faces a net negative out-of-pocket cash flow prior to consideration of parental support. This is the case for all characteristics except for veterans without previous experience. It can, therefore, be concluded that cooperative education is an effective financial aid device for students of all types.

For both co-op and non-co-op students, those with previous experience have the worst financial positions, probably because of their increased family responsibilities. Even the presence of G.I. benefits was unable to bring those non-co-op students with previous experience on a par with other non-co-op students. In fact, it required the presence of both G.I. benefits and co-op earnings to provide an average positive cash flow for the co-op students with previous experience, and even then the difference from zero is marginal and substantially below those for co-op students without previous experience.

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[1] The figures on Table 2.46 do not include travel or parental support. Therefore, the figures are intended to sum up the individual major out-of-pocket cost and revenue items described earlier, and not to represent the sum of all costs and revenues facing students. By the same token, this summation is different from that used in the rate of return analysis by explicitly considering the out-of-pocket expenses of food and housing even though they may not be influenced by college attendance (or if they are, we can't measure the extent that they are), and by not considering foregone earnings (i.e., the high school graduate endowment).

TABLE 2.46: NET FINANCIAL POSITION OF STUDENTS BY SELECTED CHARACTERISTICS FOR EACH CO-OP STATUS/SAMPLE COMBINATION[1]

			SAMPLE		
	CHARACTERISTICS		RATE OF RETURN	MISSING GRADUATE DATA	PREVIOUS EXPERIENCE
CO-OP	Total		582	610	54
	Unemployment:	High	464	456	-418
		Low	743	739	449
	Region:	Northeast	733	-64	-445
		North Central	297	739	667
		South	833	1175	528
		West	140	1463	-320
	Race:	White	242	75	38
		Non-White	1957	1204	150
	Ownership:	Public	461	670	39
		Private	934	374	313
	Veteran:	Yes	-333	---	581
		No	597	600	-649
	IV-D Funding:	Yes	390	740	192
		No	926	-35	-298
	Non-Additive Credit:	Yes	550	618	267
		No	928	478	-222
NON-CO-OP	Total		-573	-470	-761
	Unemployment:	High	-545	-479	-927
		Low	-602	-458	-586
	Region:	Northeast	-524	-692	-1290
		North Central	-882	-15	-491
		South	-661	-557	-740
		West	-189	-393	-530
	Race:	White	-578	-423	-734
		Non-White	-118	-713	-841
	Ownership:	Public	-230	-436	-742
		Private	-1395	-662	-1926
	Veteran:	Yes	194	---	-151
		No	-585	-477	-1285

[1] Figures represent the sum of annual mean tuition (Table 2.38), other school costs (Table 2.39), non-co-op earnings (Table 2.42), co-op earnings (Table 2.43), transfer payments (Table 2.44), and G.I. benefits (Table 2.45); figures do not include travel or parental support; all figures are expressed in 1976 dollars.

Additionally, those with previous experience are less likely to receive parental support and may have more transportation expense than those without previous experience. Thus, in spite of earlier findings regarding the high graduate earnings of students with previous experience, the net returns to college investment by these students are likely to be below those of co-op students without previous experience (and without the added financial responsibilities and liabilities), and may not be much higher than those for non-co-op students without previous experience.

Finally, the findings of Table 2.46 might be viewed as indicating that returns to future co-op programs may grow slightly, which return to non-co-op program will grow a great deal and thus substantially reduce the present positive co-op/non-co-op differential. (This is through a comparison of the findings for the Rate of Return Sample and the Missing Graduate Data Sample which is made up of prevailing studies from schools with new programs.) While the out-of-pocket cash position does appear to shift in this direction, not all of these cash components enter the rate of return calculation, so that any such conclusion is highly tenuous. In any event, the increase in the return to the new programs certainly would not be large enough to close the gap compared to the more established programs (i.e., the return to Liberal Arts would not approach those of Engineering & Architecture), and neither would the non-co-op return equal the co-op returns.

D. Student Attitudes and Job Performance

The final part of the student analysis will consist of two subparts. The first of these will look for associations among student attitudes and job performance by co-op status. Any meaningful relationship will be further examined after controlling for other variables to see if the relationship is generic or if the relationship can be explained by the controlling variable. The second subpart will examine the attitude of co-op students toward the cooperative education programs by student and school characteristics.

1. Student Attitudes and Job Performance

Students of all types were asked a series of questions regarding their attitudes toward their educational experience. The analytical objective was to determine whether or not significant attitudinal differences exist among students by co-op status and other selected variables.

a. Overall Satisfaction

It could be hypothesized that students in a cooperative education program would tend to be more satisfied than non-co-op students because of the on-the-job training aspects of cooperative education and other factors to be explained below. Accordingly, all students were asked their levels of satisfaction with the education being received. Table 2.47 provides the students' response frequencies to such a question. As this table shows, both co-op and non-co-op students indicated satisfaction with their current educational program by a nine to one ratio. Further, however, a Chi Square test indicates an association between satisfaction and co-op status at a 95 percent level of confidence (i.e., more co-op students are satisfied than non-co-op students). Co-op students are apparently satisfied more often than non-co-op students, although this relationship is not very strong (i.e., the Phi statistic is much closer to zero than to one).

TABLE 2.47: STUDENT SATISFACTION WITH EDUCATIONAL PROGRAM BY CO-OP STATUS[1]

RESPONSE	CO-OP		NON-CO-OP	
	Number	Percent	Number	Percent
Satisfied	1406	90.4	2009	87.8
Dissatisfied	150	9.6	279	12.2

[1] Percentages are for columns.

These same cross-tabulations were run by controlling for sample, sex, discipline area, length of program, region, unemployment level, ownership, race, and parental income. In every case, the student was satisfied with the education program by a nine to one majority. In some cases, the association between co-op status and the controlling variable was not significant at the 95 percent confidence level. For example, the association disappeared when stratified by female, Business & Management, South, low unemployment areas, Non-Whites, or parental income between $10,000 and $19,999. Thus, it is clear that students are highly satisfied with their education, and some weak (positive) association exists between satisfaction and the co-op status within most strata.

b. Relation of Student Work to Major

Students were next asked if their work experiences while in school were related to their discipline areas. Table 2.48 shows that a definite association between the "yes" and "no" responses and co-op participation (significant at the 95% level of confidence, with a Phi of .35 indicating a very strong relationship). Three-quarters of the co-op students responded that their job experiences were related to their majors, whereas only 41 percent of the non-co-op students so responded.

TABLE 2.48: STUDENT OPINION AS TO RELATIONSHIP OF STUDENT JOB TO DISCIPLINE AREA[1]

RESPONSE	CO-OP		NON-CO-OP	
	Number	Percent	Number	Percent
Yes	1103	75.7	686	41.4
No	354	24.3	972	58.6

[1] Percentages are for columns.

Tabulating the responses separately by sample, sex, discipline area, length of program, region, unemployment level, ownership, race, and parental income produced little variation in the results presented in Table 2.48. All exhibited the same significant findings (according to a Chi Square test) and the relationships were consistently of the same strength (according to a Phi test).

c. Advantages to Student Jobs

A series of five different advantages are often cited or claimed for holding a job while in college. Students were asked to rate each of these advantages by responding "very important," "somewhat important," or "not important" to each. The first of these advantages is that a student job provides an opportunity to try to match a variety of jobs to the student's preference. Table 2.49 shows the distribution of responses by co-op status.

TABLE 2.49: STUDENT OPINION OF WHETHER STUDENT JOB IS IMPORTANT IN PROVIDING AN OPPORTUNITY TO MATCH JOB WITH STUDENT PREFERENCE BY CO-OP STATUS[1]

RESPONSE	CO-OP		NON-CO-OP	
	Number	Percent	Number	Percent
Very Important	650	46.0	516	33.1
Somewhat Important	502	35.5	614	39.4
Not Important	261	18.5	427	27.4

[1] Percentages are for columns.

There is a significant (at a 95 percent level of confidence) association between the importance responses and co-op participation, although the association is not particularly strong (Cramer's V is closer to zero than to one). Over 80 percent of co-op students consider their jobs important in providing an opportunity to match their performances, whereas less than 75 percent of non-co-op students so indicate. These tabulations were made separately for the individual selected characteristics of sample, sex, discipline area, length of program, region, unemployment level, ownership, race, and parental income. In most cases, no changes were observed in the pattern of responses, but in four cases the relationship was not found, and in two others the relationship became substantially stronger.

For both students in private schools and non-White students, the relationship observed is much more evident than that in Table 2.49. Table 2.50 shows that over 90 percent of co-op students in private schools and just under 90 percent of non-White co-op students regard their jobs as important in providing opportunities to match their preferences, whereas less than 80 percent of their non-co-op counterparts so report.

This co-op/non-co-op pattern becomes less pronounced for Trade & Industrial students and students in the West, but

TABLE 2.50: STUDENT OPINION OF WHETHER STUDENT JOB IS IMPORTANT IN PROVIDING AN OPPORTUNITY TO MATCH JOB WITH STUDENT PREFERENCE BY CO-OP STATUS, PRIVATE OWNERSHIP, AND NON-WHITE[1]

	RESPONSE	CO-OP		NON-CO-OP	
		Number	Percent	Number	Percent
PRIVATE	Very Important	161	59.9	97	34.3
	Somewhat Important	86	32.0	120	42.4
	Not Important	22	8.2	66	23.3
NON-WHITE	Very Important	173	61.3	103	41.7
	Somewhat Important	76	27.0	90	36.4
	Not Important	33	11.7	54	21.9

[1] Percentages are for columns.

disappears altogether for students with previous experience and students in the Health Professions. Table 2.51 shows that co-op students in the Previous Experience Sample do not consider their jobs any more important in matching their preference than do non-co-op students with previous experience. By the same token, both co-op and non-co-op students in Health Professions attach about identical levels of importance to the student job.

The second claimed advantage is that a student job provides an opportunity to apply training to actual work. As Table 2.52 shows, there is a significant relationship (at a 95% level of confidence using a Chi Square test) between the level of importance of the job in this respect and the co-op status of the student. A total of 64.6 percent of co-op students consider the job very important and only 8.1 percent of them consider it not important as opposed to percentages of 48.3 and 18.7, respectively for non-co-op students. The association is, therefore, fairly strong (Cramer's V is .188).

TABLE 2.51: STUDENT OPINION OF WHETHER STUDENT JOB IS IMPORTANT IN PROVIDING AN OPPORTUNITY TO MATCH JOB WITH STUDENT PREFERENCE BY CO-OP STATUS, PREVIOUS EXPERIENCE, AND HEALTH PROFESSIONS[1]

	RESPONSE	CO-OP		NON-CO-OP	
		Number	Percent	Number	Percent
Previous Experience Sample	Very Important	136	36.1	152	30.6
	Somewhat Important	131	34.7	174	35.1
	Not Important	110	29.2	170	34.3
Health Professions	Very Important	16	32.0	55	31.4
	Somewhat Important	20	40.0	72	41.1
	Not Important	14	28.0	48	27.4

[1] Percentages are for columns.

TABLE 2.52: STUDENT OPINION OF WHETHER STUDENT JOB IS IMPORTANT IN PROVIDING AN OPPORTUNITY TO APPLY EDUCATION TO JOB BY CO-OP STATUS[1]

RESPONSE	CO-OP		NON-CO-OP	
	Number	Percent	Number	Percent
Very Important	918	64.6	749	48.3
Somewhat Important	388	27.3	513	33.1
Not Important	115	8.1	290	18.7

[1] Percentages are for columns.

Separate tabulations were also run by sample, sex, discipline area, length of program, region, unemployment level, ownership, race, and parental income, with variations from the pattern in Table 2.52 indicated for Engineering & Architecture, Health Professions, and private schools. Table 2.53 shows that the association between the responses and co-op participation becomes insignificant in the two discipline areas, but becomes stronger for private schools. While some more importance seems to be attributable to the job by co-op students in Engineering & Architecture and Health Professions, these percentages are not significantly different. On the other hand, co-op students in private schools attach a significant (at a 95% level of confidence) and strong (Cramer's V is .23) feeling of importance to the student job, as opposed to non-co-op students, in providing an opportunity to apply those things learned in school. About 95 percent of the co-op students so feel as opposed to only 80 percent of the non-co-op students.

TABLE 2.53: STUDENT OPINION OF WHETHER STUDENT JOB IS IMPORTANT IN PROVIDING AN OPPORTUNITY TO APPLY EDUCATION TO JOB BY CO-OP STATUS, ENGINEERING & ARCHITECTURE, HEALTH PROFESSIONS, AND PRIVATE SCHOOLS[1]

	RESPONSE	CO-OP		NON-CO-OP	
		Number	Percent	Number	Percent
Engineering & Architecture	Very Important	213	58.7	77	54.2
	Somewhat Important	111	30.6	44	31.0
	Not Important	39	10.7	21	14.8
Health Professions	Very Important	37	74.0	112	64.0
	Somewhat Important	8	16.0	39	22.3
	Not Important	5	10.0	24	13.7
Private	Very Important	167	62.1	128	45.4
	Somewhat Important	88	32.7	100	35.5
	Not Important	14	5.2	54	19.1

[1] Percentages are for columns.

The third claimed advantage for holding a student job is that it generates earning power to pay college expenses. Table 2.54 shows that there is a significant association between importance of this factor and the co-op status of the student, but, at the same time, the relationship is very weak. That is, both co-op and non-co-op students feel the job is important in this respect, but not differentially so with any strength (Cramer's V is only .05).

Again, the response to this question was tabulated separately by sample, sex, discipline area, length of program, region, unemployment level, ownership, race, and parental income. While both co-op and non-co-op students continued to report that the job was important in paying college expenses, the pattern of

TABLE 2.54: STUDENT OPINION OF WHETHER STUDENT JOB IS IMPORTANT IN GENERATING EARNINGS TO PAY COLLEGE EXPENSES BY CO-OP STATUS[1]

RESPONSE	CO-OP		NON-CO-OP	
	Number	Percent	Number	Percent
Very Important	914	64.8	1081	69.5
Somewhat Important	366	25.9	339	21.8
Not Important	131	9.3	135	8.7

[1] Percentages are for columns.

response remained essentially the same. The association became insignificant for over half of the strata, but was extremely weak (according to Cramer's V) even when statistically significant.

The fourth advantage claimed for a student job is that it provides an opportunity to assume responsibility. Table 2.55 provides an overall response to the student's feelings regarding the importance of this advantage. Clearly, the students feel that it is an advantage with co-op students feeling significantly more so. About 92 percent of co-op students feel the job is important in providing an opportunity to assume responsibility, whereas less than 87 percent of non-co-op students felt this way toward their student jobs. While there is a significant association then between the response and co-op participation, the association is not particularly strong (Cramer's V is .11).

TABLE 2.55: STUDENT OPINION OF WHETHER STUDENT JOB IS IMPORTANT IN PROVIDING AN OPPORTUNITY TO ASSUME RESPONSIBILITY BY CO-OP STATUS[1]

RESPONSE	CO-OP		NON-CO-OP	
	Number	Percent	Number	Percent
Very Important	861	61.3	785	50.8
Somewhat Important	428	30.5	556	36.0
Not Important	115	8.2	203	13.1

[1] Percentages are for columns.

When retabulating Table 2.55 by the individual strata of sample, sex, discipline area, length of program, region, unemployment level, ownership, race, and parental income, both co-op and non-co-op students continued to overwhelmingly indicate that the job is important in providing an opportunity to assume responsibility; but in three instances, the distinction between co-op and non-co-op responses could not be made. In Health Professions, Trade & Industrial, and in the North Central region, the importance of the job was still recognized, but not differentially by co-op and non-co-op students.

The last claimed advantage of this question sequence was that a student job increases the student's chance of acquiring a good job upon graduation. Table 2.56 shows that students feel that student jobs are important in acquiring good jobs on graduation by a nine to one ratio. Co-op students, however, indicate a significantly stronger feeling of importance for the job in this respect. Almost 75 percent of the co-op students feel the student job is very important, whereas only 60 percent of the non-co-op students feel this way. This association between feelings of job importance and student co-op status, while significant at a 95 percent level of confidence, is only moderately strong (Cramers V is .16).

TABLE 2.56: STUDENT OPINION OF WHETHER STUDENT JOB IS IMPORTANT IN INCREASING THE CHANCES OF SECURING A BETTER JOB UPON GRADUATION BY CO-OP STATUS[1/]

RESPONSE	CO-OP		NON-CO-OP	
	Number	Percent	Number	Percent
Very Important	1056	74.6	926	59.5
Somewhat Important	263	18.6	422	27.1
Not Important	96	6.8	207	13.3

[1/] Percentages are for columns.

The same favorable response concerning the importance of the student job in obtaining good employment following graduation was observed when stratifying by sample, sex, discipline area, length of program, region, unemployment level, ownership, race, and parental income. The relationship between the responses of co-op students and non-co-op students did not remain invariant with respect to the controlling variables (i.e., the separate strata). While the relationship was never reversed in a significant sense, the strata of Previous Experience Sample, Health Professions, and Trade & Industrial did produce response patterns that did not vary significantly between co-op and non-co-op students. In addition, the strata of private schools and Non-White students both produced accentuated co-op/non-co-op response differences. For example, the private strata included 97 percent of the co-op responses as somewhat important or very important, as opposed to only 85 percent for non-co-op students; and the corresponding responses of Non-White students were 96 and 87 percent. Eighty-two percent of co-op Non-White students responded as "very important" compared to only 64 percent of the Non-White, non-co-op students. These associations were strong with the private school strata indicating a Cramer's V of .26 while that for Non-Whites was .21.

In summary, all five of the advantages alleged for co-op participation appear to be significantly more frequently considered as important by co-op students than by non-co-op students, although the advantage claimed in the case of providing earnings to pay for college expenses was very weak. These relationships continued to hold when the responses were stratified by a number of school and student characteristics, even though some fairly consistent deviations were observed. For example, both the stratum of co-op students attending private schools and the stratum of non-White co-op students considered most of the advantages more important than their non-co-op counterparts by a far greater margin than did the co-op students in other strata--particularly the matching of jobs with skills and the improvement of chances of obtaining a good job upon graduation. At the same time, however, those co-op students with previous experience, those in Health Professions, and those in Trade & Industrial indicated that they considered these advantages no more important than did their non-co-op counterparts. It is interesting to note that in no case was any of these "advantages" considered more important by non-co-op students than by co-op students. These considerations are more advantageus for most co-op students, particularly so for Non-Whites and students in private schools, although not for students with previous experience or students in the discipline areas of Trade & Industrial and Health Professions.

These opinions regarding perceived advantages of the co-op programs by co-op students are also consistent with the levels of overall satisfaction experienced earlier by the students, as well as the perceived relationships of the student work to the major. In most cases, the co-op students indicated a higher level of satisfaction with their programs than the non-co-op students, and co-op students indicated that the student work was closely related to the major much more often than non-co-op students, regardless of student or school type.

d. Current Job Descriptions

In order to gain some insight into the students satisfaction with (and performance on) the job, a series of 10 separate questions were asked with a range of response from "always" to "never" permitted. Table 2.57 presents these responses for all students by co-op status. In eight of the ten questions, the response patterns were significantly different for co-op student than for non-co-op students. The only non-significant findings were for questions concerning whether the student decided how things should get done and whether their boss often asks their opinion about work. Over two-thirds responded "sometimes" to both questions.

TABLE 2.57: PERCENTAGE RESPONSES OF STUDENTS TO INDIRECT MEASURES OF JOB SATISFACTION AND RESPONSIBILITY BY CO-OP STATUS[1]

JOB-RELATED QUESTIONS[2]	CO-OP			NON-CO-OP		
	ALWAYS	SOMETIMES	NEVER	ALWAYS	SOMETIMES	NEVER
Do you decide how things are done?	15.1	71.5	13.4	16.7	67.6	15.7
Does your boss often ask your opinion ?	18.3	63.9	17.8	19.3	59.9	20.9
Can you do your job without thinking?*	8.9	39.3	51.8	13.6	44.0	42.5
Do you learn something new each day?*	38.2	56.5	5.2	26.7	60.5	12.8
Are you interested enough in your job to learn things after work?*	27.3	56.9	15.8	20.0	49.6	30.4
Does your boss tell you when you do a good job?*	34.9	53.2	11.8	27.7	56.5	15.8
Do you do things off the job with the people you work with?*	12.2	59.9	27.9	15.3	60.8	23.9
Do you get paid less than other workers who do the same job?*	25.0	26.3	48.7	14.8	28.7	56.5
Do they have to find a replacement for you when you are absent?*	21.4	33.3	45.2	31.3	34.9	33.8
Have you had many different assignments on this job?*	41.4	49.3	9.3	32.2	50.4	17.4

[1] All figures in the table are row percentages.

[2] "*" denotes significant co-op versus non-co-op differences for the response patterns at the 95 percent level of confidence using Chi Square tests.

The remaining responses indicate that significantly fewer co-op students can do their jobs without thinking, associate with fellow workers after hours, and require a replacement when absent. Apparently they are given jobs that require some thinking, but that are postponable--possibly a job not in the mainstream of the business. This would also explain the tendency to associate less with those doing the mainstream jobs. At the same time, students responded that significantly more co-op students learn something new each day, learn things after work, are told they do a good job, get paid less, and receive multiple assignments. These responses fit into the pattern of being assigned a number of special tasks rather than being assigned a mainstream job. This type of job would require more thinking, is more apt to induce praise, and is also likely to elicit less pay. Generally, these jobs probably provide better training than jobs in the mainstream.

It is interesting that all nine of these questions were also asked of graduates (see Table 2.17) where the only significant non-co-op differences were regarding being asked one's opinion, the necessity for a replacement when absent, and the number of job assignments. A comparison of the student and graduate findings indicates that the co-op participants continue to receive multiple job assignments, and require replacements when absent less often, after graduation. Other than these, the co-op graduates are differentiable from non-co-op graduates in only one respect: after graduation, co-op graduates begin to be asked their opinions about the job more often than non-co-op graduates.

The tabulations of Table 2.57 were redone for the separate strata of sample, sex, discipline area, length of program, region, unemployment level, ownership, race, and parental income to see if these strata could account for or explain the co-op/non-co-op differences found on Table 2.57. The results of these tabulations are presented in Table 2.58 (note the parallel between this table and Table 2.18, above). The first column of Table 2.58 repeats the information supplied in Table 2.57. The remaining columns, however, display the results by individual strata.

TABLE 2.58: SIGNIFICANT INDIRECT MEASURES OF STUDENT JOB SATISFACTION AND RESPONSIBILITY BY CO-OP STATUS AND OTHER SELECTED CHARACTERISTICS[1]

	SAMPLE				SEX		DISCIPLINE AREA					LENGTH		REGION				AREA		OWNERSHIP		RACE		PARENTAL INCOME			
	Total	Rate of Return	Previous Experience	Missing Graduates	Male	Female	Engineering & Architecture	Business & Management	Health Professions	Liberal Arts	Trade & Industrial	2-Year	4-Year	Northeast	North Central	South	West	High Unemployment	Low Unemployment	Public	Private	White	Non-White	$5500	$5,500 - $9,999	$10,000 - $19,999	$20,000
Do you decide how things are done?			*		*																					*	
Does your boss often ask your opinion about work?			*		*					*								*				*					
Can you do your job without thinking?	(*)	(*)		(*)	(*)		(*)	(*)		(*)		(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)			(*)	
Do you learn something new each day?	*	*	*	*	*	*	*	*		*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Are you interested enough in your job to learn things after work?	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Does your boss tell you when you do a good job?	*		*		*		*	*		*		*		*	*	*		*	*	*	*	*				*	
Do you do things off the job with the people you work with?	(*)	(*)		(*)		(*)		(*)								(*)			(*)	(*)						(*)	
Do you get paid less than other workers who do the same job?	*	*			*	*	*	*	*				*	*	*	*		*	*	*	*	*	*	*		*	*
Do they have to find a replacement for you when you are absent?	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)		(*)		(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Have you had many different assignments on this job?	*	*	*	*	*	*	*	*		*		*	*	*	*	*	*	*	*	*	*	*		*		*	*

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[1] "*" denotes significant co-op/non-co-op response differences at a 95 percent level of confidence. All significant findings indicate more frequent positive responses from co-op students, except those presented in parentheses.

In only three strata do co-op students more frequently decide how things should get done than non-co-op students: those with previous experience, males, and students whose parents earn between $10,000 and $20,000 annually. The first is expected (i.e., those with previous experience should know how to get things done), and the second may represent a form of sex bias currently prevalent in our society, but the third does not seem to have a reasonable interpretation. Apparently, co-op students are asked their opinions more often than non-co-op students in five separate strata: previous experience, males, Liberal Arts, high unemployment, and Whites. The presence of a significant co-op/non-co-op difference for Liberal Arts is interesting but not explicable.

For most strata, co-op students must continue to think more to get the job done. Exceptions are those with previous experience (they already "know the ropes"), females (reflection of the job assignments for all females?), Health Professions (it is probably not wise to give any student a job where a great deal of decision making is involved), Trade & Industrial (could be categorized as containing jobs where decision making is not required), and parental income (apparently, controlling for parental income explains, in large part, the co-op/non-co-op differences relative to a thinking job). Only in Health Professions and Trade & Industrial strata do co-op students not learn something new each day more often than non-co-op students. This is surprising for Health Professions unless students are given menial tasks to perform. Surprisingly, however, this is contradicted by the fact that for both Health Professions and Trade & Industrial strata co-op students are still significantly more interested enough in the job to learn things after work. In fact, no stratification resulted in the diminution of this significant co-op/non-co-op differential.

In several strata co-op students no longer received more frequent congratulations on a job well-done than non-co-op students. For example, such was the case for those students without previous experience. This is surprising in that one would expect the differential to be maintained for this group and to disappear for those with previous experience. Females, and the discipline areas of Health Professions and Trade & Industrial, also exhibit a lack of co-op/non-co-op differences in frequencies of "well-dones." The stratification by 4-year programs and Non-Whites also removed the co-op/non-co-op differential, as did most of the stratifications by parental income. Even more striking is the stratification of the response to the question about socializing with fellow workers. The co-op/non-co-op difference is removed when stratifying, except in the cases of those without previous experience, females, Business & Management, the South, low unemployment areas, and public schools. Apparently, it is in these strata only that mainstream student jobs are the rule.

The pay of co-op students continues to be significantly lower than non-co-op students except for those with previous experience and those in relatively new programs, those in 2-year programs, those in Liberal Arts or Trade & Industrial, and those in the next to lowest parental income group. Replacements need to be found less often for co-op students in all strata except Health Professions and Trade & Industrial and multiple job assignments are more common for co-op students in these discipline areas plus the strata of Non-White and the next to lowest parental income group.

In sum, Table 2.58 indicates some interesting findings across all questions. Both Health Professions and Trade & Industrial stratifications result in a lack of distinction between co-op and non-co-op students. Significantly lower wages are paid co-op than non-co-op in Health Professions and both discipline areas distinguish co-op students as interested enough to learn after work, but, other than that, no other differences are apparent. In general, parental income stratification (except for the $10,000 to $19,999 group) seems to remove most co-op/non-co-op response differences.

Stratification changes the results most in the questions concerning the socialization of the student with fellow workers, and changes the results least in the questions regarding learning both at work and after work. The implication of these findings are that, again, Health Professions and Trade & Industrial discipline areas contain students who are largely undifferentiable by co-op students. At the same time, many of the observed co-op/non-co-op differences can be explained by variations in parental income. Finally, socialization with fellow workers is most often explained by difference in attributive other than co-op status, whereas the propensity for co-op students to learn more at work and after work is not explained by other characteristics and is truly attributable to co-op participation.

2. Attitudes of Co-op Students Toward Cooperative Education Programs

A total of four different sets of questions was asked of co-op students. The first asked how important varying factors were in participating in co-op, the second requested a ranking of four key reasons for co-op participation, the third rated the co-op program on a series of quality items, and the fourth asked for recommendations regarding the co-op program for other undergraduates. These responses were run for all co-op students and for the strata of sample, sex, discipline area, program length, region, level of unemployment, ownership, race, and parental income.

a. Importance of Factors for Co-op Participation

Co-op students were asked whether the fact that co-op participation was mandatory for a particular discipline area influenced their decision to participate in co-op. Table 2.59 shows that over-half of the co-op participants indicated that it was important, and over one-third indicated that it was very important. This pattern of responses was not influenced by parental income, level of unemployment, or school ownership, but it was significantly influenced by the other characteristics presented in Table 2.59.

TABLE 2.59: CO-OP STUDENT OPINION AS TO IMPORTANCE OF MANDATORY CO-OP PARTICIPATION IN SELECTING CO-OP PROGRAM BY SELECTED CHARACTERISTICS[1]

CHARACTERISTICS	IMPORTANCE		
	VERY	SOMEWHAT	NOT
Total	35.6	21.5	42.9
Sample: Rate of Return	43.6	19.8	36.6
Previous Experience	32.6	24.7	42.7
Missing Graduate Data	19.5	20.8	59.7
Sex: Male	31.8	22.0	46.2
Female	41.8	24.0	34.2
Discipline Area:			
Engineering & Architecture	31.8	17.5	50.7
Business & Management	34.2	26.6	37.3
Health Professions	52.5	20.3	27.1
Liberal Arts	23.8	18.0	45.0
Trade & Industrial	30.5	23.8	45.7
Program Length: 2-year	38.1	27.7	34.2
4-year	39.9	18.7	41.5
5-year	21.1	15.8	63.2
Region: Northeast	52.3	17.1	30.6
North Central	43.5	21.3	35.2
South	28.6	26.3	45.1
West	23.0	23.0	53.9
Race: White	35.2	21.3	43.5
Non-White	36.6	27.7	35.6

[1] All figures are percentages; all results shown are significantly different at a 95 percent level of confidence as determined through Chi Square tests.

Those co-op students with previous experience displayed the same pattern as the total sample but mandatory participation was much more important for those in the Rate of Return Sample and much less important for those in schools where we could obtain no graduate data. Apparently, mandatory participation is a much more important factor for females than males, also. These results are probably explained by the differences by discipline area, where over half of those in Health Professions report mandatory participation as very important (largely because co-op programs are mandatory in this discipline area). The lowest level of importance was found in the Liberal Arts stratum.

Program length showed that mandatory participation was a little more important for 2-year schools (because of Health Professions?), but definitely less important for 5-year programs. Less than 40 percent considered this reason as important in determining co-op participation. Both the West and South regions exhibited little importance for this factor (although only West indicated that less than half of the students considered the factor important), whereas both Northeast and North Central were distinguishable by the great degree of importance attached to the factor. (Over half of the students in the Northeast considered it very important). Finally Whites considered the factor only slightly less important than non-Whites.

Co-op students were questioned as to whether the additional income through co-op employment was important in their decision to participate. Table 2.60 shows that just about one-third responded in each category so that about two-thirds of the co-op students thought this factor to be important. Apparently, this proportion feels that co-op participation was an important student aid device. Tabulations by separate strata indicated significant deviations from this pattern for all except the separate sample strata, so that those with previous experience do not anticipate the added income, probably because they already have jobs lined up.

Males consider the added earnings as more important in the decision to participate than females. This may be reflected further in the high importance indicated by Engineering & Architecture students and the low importance indicated by Health Professions students for this factor. It also appears as if the importance of the added income increases with the program length, as expected. The West and the Northeast both display low levels of importance for this factor, although the explanation is not altogether clear.

TABLE 2.60 : CO-OP STUDENT OPINION AS TO IMPORTANCE OF ADDITIONAL INCOME FROM CO-OP PARTICIPATION WHEN ESSENTIAL TO CONTINUE EDUCATION IN SELECTING CO-OP PROGRAM BY SELECTED CHARACTERISTICS[1]

CHARACTERISTICS		IMPORTANCE		
		VERY	SOMEWHAT	NOT
Total		33.1	32.6	31.1
Sex:	Male	36.4	32.5	31.1
	Female	28.7	31.6	39.7
Discipline Area:				
Engineering & Architecture		44.1	34.4	21.5
Business & Management		28.9	33.5	37.6
Health Professions		23.2	30.4	46.4
Liberal Arts		32.1	25.7	42.2
Trade & Industrial		30.8	36.5	32.7
Program Length:	2-year	27.4	31.4	41.2
	4-year	33.3	33.3	33.5
	5-year	49.8	32.9	17.3
Region:	Northeast	29.7	30.8	39.5
	North Central	37.7	28.3	34.0
	South	37.7	36.1	26.2
	West	27.4	29.0	43.5
Unemployment:	High	33.5	28.9	37.7
	Low	33.9	36.1	30.0
Ownership:	Public	30.9	32.6	36.5
	Private	45.4	30.9	23.8
Race:	White	31.4	31.4	37.3
	Non-White	43.3	36.2	20.5
Parental Income:	<$5,500	40.9	36.0	23.2
	$5,500-$9,999	39.4	36.5	24.2
	$10,000-19,999	33.1	32.7	34.2
	>$20,000	22.0	27.1	50.9

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[1] All figures are percentages; all results shown are significantly different at a 95 percent level of confidence as determined through Chi Square tests.

High unemployment levels and attendance at a private school encourage students to attach more importance to the added co-op earnings, as expected. Also as expected, non-Whites consider the added income as more important in choosing a co-op program, probably because of differences in parental income. Clearly, the importance of the co-op income increases as parental income declines. Table 2.60 shows this relationship to be quite distinct.

Co-op students were also asked to assess the importance of co-op income even though it may not be needed to continue education. Table 2.61 indicates that, while slightly more students responded that the income was "not important" in this case than in circumstances where the income was necessary to stay in school, the big change from Table 2.55 is the shift away from "very important" to "somewhat important." Less than half the number of those reporting their income as "somewhat important" reported it as "very important." Again, the distributions were examined by individual strata for variations from this pattern, and only the strata of simple, discipline area, unemployment level, and ownership qualified as significantly different for presentation on Table 2.61.

Clearly, those with previous experience considered the co-op income as less important under these circumstances, whereas those from the Missing Graduate Data Sample considered the income much more important. This may be a reflection of the higher proportions of females and non-Whites in this sample. By discipline area, the results are very mixed with Engineering & Architecture attaching the most importance (although not the most frequent "very important" response) to this income, and Health Professions the least. This is consistent with the findings of Table 2.60. Also consistent with Table 2.60 are the patterns for the unemployment and ownership strata. High unemployment areas and public schools are attributes which cause co-op students to attach less importance to this income source under conditions of non-necessity.

TABLE 2.61: CO-OP STUDENT OPINION AS TO IMPORTANCE OF CO-OP INCOME WHEN NOT ESSENTIAL TO CONTINUING EDUCATION IN SELECTING CO-OP PROGRAM BY SELECTED CHARACTERISTICS[1]

CHARACTERISTICS	IMPORTANCE		
	VERY	SOMEWHAT	NOT
Total	20.0	42.4	37.7
Sample: Rate of Return	19.5	46.2	34.3
Previous Experience	15.4	35.0	49.6
Missing Graduate Data	28.4	44.4	27.2
Discipline Area:			
Engineering & Architecture	16.2	50.5	33.2
Business & Management	22.9	42.4	34.7
Health Professions	27.3	27.3	45.5
Liberal Arts	16.6	39.9	43.5
Trade & Industrial	21.0	41.0	38.1
Unemployment: High	19.7	39.2	41.1
Low	20.3	47.8	31.1
Ownership: Public	18.9	42.7	38.4
Private	25.1	45.6	29.3

[1] All figures are percentages; all results shown are significantly different at a 95 percent level of confidence as determined through Chi Square tests.

The fourth question posed to the co-op students was how important was co-op participation in acquiring career objective skills. Table 2.62 shows that over three-quarters of all co-op students consider this factor as extremely important in their choice of a co-op program. In fact, over 96 percent consider it as important. Significant variations in this pattern were observed for all separate strata except parental income, unemployment level, and race.

Those co-op students with previous experience attach less importance to this factor. By the same token, students attending public schools and male students indicate less importance for

TABLE 2.62: CO-OP STUDENT OPINION AS TO IMPORTANCE OF CO-OP PARTICIPATION FOR SKILL ATTAINMENT IN SELECTING CO-OP PROGRAM BY SELECTED CHARACTERISTICS[1/]

CHARACTERISTICS	IMPORTANCE		
	VERY	SOMEWHAT	NOT
Total	76.4	20.0	3.5
Sample: Rate of Return	79.0	18.2	2.8
Previous Experience	69.8	24.6	5.5
Missing Graduate Data	80.6	17.3	2.1
Sex: Male	74.6	21.6	3.9
Female	82.7	15.0	2.3
Discipline Area:			
Engineering & Architecture	79.1	19.6	1.3
Business & Management	79.6	17.0	3.4
Health Professions	80.0	16.7	3.3
Liberal Arts	77.0	18.9	4.1
Trade & Industrial	60.4	32.1	7.5
Program Length: 2-year	72.1	22.6	5.3
4-year	84.8	13.3	1.8
5-year	79.5	19.9	0.7
Region: Northeast	80.6	15.7	3.8
North Central	79.9	19.2	0.9
South	78.6	18.1	3.3
West	69.7	25.8	4.5
Ownership: Public	76.7	19.4	3.9
Private	80.4	18.9	0.7

[1/] All figures are percentages; all results shown are significantly different at a 95 percent level of confidence as determined through Chi Square tests.

the skill acquisition factor. Students in 4-year programs respond more frequently with "very important" for this factor, although students in 5-year programs report more often that the factor is important. (In fact, virtually all of the 5-year co-op students so indicate.) Finally, Trade & Industrial co-op students suggest a level of importance below those in other discipline areas. Only 60 percent rate this factor as "very important."

Table 2.63 indicates that the recommendations of respected individuals are important factors about three-quarters of the time and influences co-op participation. The only instance in which this pattern differed significantly was by region, and the association was not strong (Cramer's V is .068). Apparently, the recommendations of individuals are more important in the South and North Central regions.

TABLE 2.63: CO-OP STUDENT OPINION AS TO IMPORTANCE OF PERSONAL RECOMMENDATIONS IN SELECTING CO-OP PROGRAM BY SELECTED CHARACTERISTICS[1/]

		IMPORTANCE		
CHARACTERISTICS		VERY	SOMEWHAT	NOT
Total		31.1	44.1	24.8
Region:	Northeast	28.2	43.1	28.7
	North Central	36.3	44.7	19.1
	South	32.6	45.3	22.1
	West	28.6	42.1	29.3

[1/] All figures are percentages; all results shown are significantly different at a 95 percent level of confidence as determined through Chi Square tests.

Students were asked to evaluate the possibility of making the educational experience more rewarding as a reason for participating in co-op. Table 2.64 indicates that 93 percent said that this was an important inducement to participation in co-op, and about 65 percent said it was a "very important" reason. All tabulations by strata, except for unemployment level and school ownership, produced significantly varying results, however. Those students with previous experience considered it much less important, whereas those in schools from which graduate data could not be obtained indicated a significantly higher level of importance for this reason.

Males considered a rewarding educational experience less important for choosing co-op than did females, and Whites less

TABLE 2.64: CO-OP STUDENT OPINION AS TO IMPORTANCE OF MORE REWARDING EXPERIENCE IN SELECTING CO-OP PROGRAM BY SELECTED CHARACTERISTICS[1]

CHARACTERISTICS	IMPORTANCE		
	VERY	SOMEWHAT	NOT
Total	64.2	28.8	6.9
Sample: Rate of Return	65.4	28.6	6.0
Previous Experience	57.2	32.2	10.6
Missing Graduate Data	72.7	23.9	3.4
Sex: Male	61.1	30.2	8.7
Female	71.1	24.1	4.8
Discipline Area:			
Engineering & Architecture	65.0	29.2	5.7
Business & Management	67.8	27.6	7.7
Health Professions	72.9	22.0	5.1
Liberal Arts	70.5	23.8	5.6
Trade & Industrial	43.8	37.1	19.0
Program Length: 2-year	59.6	30.9	9.4
4-year	71.7	23.6	4.7
5-year	66.6	27.4	6.0
Region: Northeast	65.7	26.2	8.1
North Central	66.5	30.7	2.8
South	66.9	26.8	6.3
West	57.8	30.5	11.7
Race: White	62.0	30.0	8.0
Non-White	74.5	20.5	5.0
Parental Income: < $5,500	72.2	22.0	5.9
$5,500-$9,999	64.6	28.9	6.4
$10,000-$19,999	61.8	32.1	6.1
>$20,000	66.1	22.5	11.4

[1] All figures are percentages; all results shown are significantly different at a 95 percent level of confidence as determined through Chi Square tests.

than non-Whites. The discipline area of Trade & Industrial and the West region both were associated with significantly less importance, although the reasons for this are not clear. The students in 2-year programs also did not rate this reason as important as students in general, while those in 4-year schools rated it highly important.

Finally, significant variations were found by parental income levels, with the level of importance declining with increased parental income.

The strong possibility existed that co-op participation is chosen because it prepares the student for a changing job market. Accordingly, co-op students were asked whether this was an important reason for participating. Table 2.65 indicates that the co-op students responded in the affirmative 85 percent of the time, with over half considering this reason as "very important." Significant variations on this theme were present for each stratum, except for parental income and school ownership.

Those co-op students with previous experience would rate this reason as significantly less important than other co-op students. On the other hand, both Non-Whites and females assign a much greater level of importance to this reason. Students in the South and those in Business & Management rate this reason as much more important than others, whereas both Health Professions and Trade & Industrial do not accord as high a level of importance to the preparation for a changing job market. Finally, students in programs longer than two years in length consider this aspect of co-op participation more important than do those in 2-year programs.

The last reason of this series explored was the possibility that co-op participation might make it easier to obtain employment upon graduation. Co-op students were asked to rate the importance of this reason, and the results are presented in Table 2.66. About 90 percent of the co-op students indicated that this was an important reason for participating in co-op, 65 percent indicating that it is a "very important" reason. Females and Whites consider the reason more important than males and non-Whites, and students in private schools consider the reason more important than those in public schools. Students in the North Central and South regions attached much greater importance to this reason than students in general, whereas co-op students in the West display a much lower level of importance to this reason.

TABLE 2.65: CO-OP STUDENT OPINION AS TO IMPORTANCE OF JOB MARKET PREPARATION IN SELECTING CO-OP PROGRAM BY SELECTED CHARACTERISTICS[1]

CHARACTERISTICS		IMPORTANCE		
		VERY	SOMEWHAT	NOT
Total		53.4	31.6	15.0
Sample:	Rate of Return	55.0	32.3	12.7
	Previous Experience	46.9	31.0	22.1
	Missing Graduate Data	59.7	30.9	9.3
Sex:	Male	50.5	31.4	18.2
	Female	60.8	29.6	9.6
Discipline Area:				
	Engineering & Architecture	52.9	33.3	13.8
	Business & Management	60.0	28.5	11.5
	Health Professions	45.8	30.5	23.7
	Liberal Arts	51.9	29.5	18.6
	Trade & Industrial	44.2	32.7	23.1
Program Length:	2-year	50.7	31.6	17.7
	4-year	58.7	28.0	13.3
	5-year	55.4	32.8	11.8
Region:	Northeast	51.0	28.0	21.0
	North Central	54.9	32.4	12.7
	South	58.4	31.9	9.7
	West	48.4	30.3	21.3
Unemployment:	High	51.5	30.8	17.8
	Low	57.0	30.7	12.3
Race:	White	51.5	32.1	16.4
	Non-White	64.2	26.3	9.6

[1] All figures are percentages; all results shown are significantly different at a 95 percent level of confidence as determined through Chi Square tests.

A dichotomy of opinion is also observed between co-op students in 2-year programs and those in 4-year and 5-year programs with respect to this reason. The former shows a much lower importance rating than do the latter. The same can be said on the basis of previous experience: those co-op students with previous experience respond six times as often that they do not consider this an important reason for participating in co-op. Lastly, the possibility

TABLE 2.66: CO-OP STUDENT OPINION AS TO IMPORTANCE OF BETTER GRADUATE EMPLOYMENT POSSIBILITIES IN SELECTING CO-OP PROGRAM BY SELECTED CHARACTERISTICS[1]

CHARACTERISTICS	IMPORTANCE		
	VERY	SOMEWHAT	NOT
Total	65.1	22.5	12.3
Sample: Rate of Return	73.0	21.9	5.1
Previous Experience	49.2	21.8	29.0
Missing Graduate Data	70.3	25.4	4.2
Sex: Male	62.3	22.4	15.3
Female	72.7	21.3	6.0
Discipline Area:			
Engineering & Architecture	72.4	22.4	5.3
Business & Management	66.1	20.5	13.4
Health Professions	71.7	21.7	6.7
Liberal Arts	60.8	21.7	17.5
Trade & Industrial	56.2	25.7	18.1
Program Length: 2-year	59.0	23.1	17.8
4-year	73.3	19.1	7.5
5-year	72.3	23.6	4.1
Region: Northeast	64.5	24.0	11.4
North Central	70.4	22.5	7.0
South	70.4	21.5	8.1
West	55.9	20.6	23.5
Ownership: Public	64.8	21.3	13.9
Private	71.0	25.1	3.9
Race: White	72.0	21.8	6.1
Non-White	64.5	22.0	13.5

[1] All figures are percentages; all results shown are significantly different at a 95 percent level of confidence as determined through Chi Square tests.

of finding graduates employment more easily is a significantly bigger influence in the discipline areas of Engineering & Architecture and Health Professions, and a significantly smaller influence in Trade & Industrial, than for co-op students as a whole.

b. Student Rankings of Key Reasons

A recapitulation of the series of reason for participating in co-op is presented in Table 2.67. This table shows that

TABLE 2.67: RECAPITULATION OF OVERALL CO-OP STUDENT OPINION AS TO IMPORTANCE OF REASONS FOR SELECTING CO-OP PROGRAM[1]

REASONS FOR CO-OP PARTICIPATION	IMPORTANCE		
	VERY	SOMEWHAT	NOT
Mandatory for Major	35.6	21.5	42.9
Additional Income Necessary	33.1	32.6	34.3
Additional Income Wanted	20.0	42.4	37.7
Skills Related to Career Objectives	76.4	20.0	3.5
Recommended by Respected Person	31.1	44.1	24.8
Make Educational Experience Rewarding	64.2	28.8	6.9
Prepare for Changing Job Market	53.4	31.6	15.0
Easier Final Graduate Employment	65.1	22.5	12.3

[1] All figures are row percentages.

the possibility of obtaining skills related to one's career objectives is the reason most frequently cited as important. The least often cited is the fact that co-op participation may be mandatory for the chosen major (probably because it is not mandatory very often), with the income from co-op employment not far behind, whether desirable or necessary for the education to continue.

To get a better handle on the student ranking of reasons, a series of four key reasons were presented to co-op students and they were asked to rank them. Those reasons were:

- Co-op enables me to develop useful skills especially related to my career goals.
- My co-op work experience provides valuable exposure to the general world of work.
- Co-op provides a valuable academic education.
- The earnings from my co-op job enable me to more easily finance my education.

Based on the findings in Table 2.67, the rankings of Table 2.68 should turn out to be in the order listed above. That is, the reason of skills related to career goals is clearly the expected choice for the number one ranking, and the reason of financing of the education is equally as clear as the expected choice for the number four ranking. Expectations concerning the rankings are not as clear from Table 2.67. There is no single corresponding item relating to the reason relating to exposure to the world of work. Possibly a combination of preparation for a changing job market and finding graduate employment could be used, but the average of these percentage responses is not much different from those that co-op is a rewarding experience. In any event, the rankings of these four reasons by the students are presented in Table 2.68.

TABLE 2:68 CO-OP STUDENT RANKING OF REASONS FOR CO-OP PARTICIPATION[1]

REASONS FOR CO-OP PARTICIPATION	RANKING			
	1	2	3	4
Develop Skills Related to Career Goals	51.1	28.2	14.1	6.6
Co-op Job Provides Exposure to World of Work	25.2	36.9	24.0	14.0
Co-op Provides a Valuable Academic Education	9.9	19.6	40.4	30.1
Co-op Earnings Finance My Education	24.9	12.7	18.1	44.3

[1] All figures are row percentages

As expected, developing skills related to career goals was ranked number one by over half of the students and is clearly the primary reason for participating in co-op. Likewise, exposure to the world of work was most often ranked number two, a valuable education was most often ranked as number three, and financial considerations were most often ranked last (as expected).

These rankings were run separately by sample, sex, discipline area, program length, region, unemployment level, ownership, race, and parental income; and, while there were some variations in the percentages associated with each ranking, the overall rankings remained remarkably stable. For example, regardless of the stratification, the reasons of developing skills related to career goals and the provisions of exposure to the world of work retained the rankings of one and two, respectively, in each case. That is, the largest percentage of individuals always reported these reasons as the most important and the second in importance, respectively.

Unanimity of ranking was not the case for the last two reasons, however. Selected stratifications did produce slight variations rankings. For example, the financial considerations were the most frequent (rather than the least frequent) reason given by those in the discipline areas of Engineering & Architecture and Trade & Industrial, and by those attending 5-year programs. At the same time, these strata, plus those attending school in the North Central region and those in private schools, indicated that the provision of a valuable academic education was ranked fourth more often than third. In sum, in spite of these changes in rankings for selected strata, the consistency of the rankings of reasons for the total and for individual strata are remarkable.

c. Student Ratings of Co-op Program Quality

Co-op students were asked to rate 10 separate aspects of the co-op programs on a scale of one to five, where one represents poor and five represents excellent. The mean scores or ratings of all of the 10 items are presented in Table 2.69. The results of these tabulations are quite clear: the co-op programs are rated above average on all items, but the highest ratings were received on the adequacy of the employer facilities, the quality of employer training, the quality of college instruction, and the overall quality of co-op program, whereas the lowest mean rating was found in

TABLE 2.69: CO-OP STUDENT RATINGS OF CO-OP PROGRAMS ON SELECTED ITEMS[1]

RATING ITEMS	NUMBER	MEAN SCORE
1. Quality of instruction or training from co-op employers	1149	3.843
2. Adequacy of employers' facilities	1142	3.925
3. Relevancy of classwork to work experience	1150	3.513
4. Recruitment of employers in Career-relevant areas	1131	3.457
5. On-going communication with employers	1143	3.672
6. Counseling in career planning	1148	3.199
7. Placement of students in work experience	1140	3.544
8. Placement of students upon graduation	1076	3.419
9. Quality of instruction at college	1156	3.819
10. Overall quality of co-op program	1154	3.918

[1] Ratings were on a 5-point scale with a score of (1) equalling "poor" and a score of (5) equalling "excellent."

counseling for career planning. Using t-tests to look for significant pair-wise differences produced 40 out of a possible 45 comparisons which were significant. Non-significant differences were the comparisons of items 1 and 9, 2 and 10, 3 and 4, 3 and 7, and 4 and 8.[1]

Each of the item responses was tabulated by the separate strata of sample, sex, discipline area, program length, region, unemployment level, ownership, race, and parental income. For items 2, 4, and 5 (employer facilities, recruitment of employers in career-relevant areas, and on-going communication with employers), none of these stratifications produced mean rating scores significantly different only by the sample stratifications. Table 2.70 shows the mean scores for the quality of employer training, and Table 2.71 shows the scores for the overall quality of the co-op program. In both instances the score systematically increases as the sample changes from Rate of Return to Previous Experience to Missing Graduate Data, with the latter two above the overall mean and the first below the overall mean. In these cases, previous experience and program newness apparently leads to a greater appreciation of the co-op structure of education.

Stratification of item 9 regarding the quality of college instruction resulted in significant differences only when considering the sex of the student. Table 2.72 shows that females regard the quality of co-op college instruction more highly than do males. Ordinarily, one might suppose that this result would be a function of specialization by discipline area, but this stratification did not produce significant difference so that the differences on Table 2.72 are due to sex and not some other underlying factor.

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[1] Since the data here are nominal, the data are likely to be non-symmetrical or likely to be either very flat or very peaked. This does not invalidate the use of a normal-theory F-table, but does indicate that the probabilities read from such a table are too small to represent the true risk of a Type I error. Therefore, in order to approximate a true risk of 5 percent, an apparent risk (confidence level) of 1 percent was used in all significance tests involving these ten items. (See E.F. Lindquist, "The Norton Study of the Effects of Non-Normality and Heterogeneity of Varions," Chapter 40, in Contemporary Problems in Statistics edited by Bernhardt Lieberman (Oxford University Press: New York), 1971 or D.W. Norton, "An Experienced Investigation of Some Effects of Non-Normality and Heterogeneity on the F-distribution," Unpublished Ph.D. Thesis in Education, State University of Iowa, 1952.).

TABLE 2.70: QUALITY RATING OF CO-OP STUDENTS ON CO-OP EMPLOYER TRAINING BY SAMPLE[1]

CHARACTERISTICS		NUMBER	MEAN SCORE
Total		1149	3.843
Sample:	Rate of Return	568	3.741
	Previous Experience	371	3.876
	Missing Graduate Data	210	4.062

[1] Ratings were on a 5-point scale with a score of (1) equalling "poor" and a score of (5) equalling "excellent."

TABLE 2.71: OVERALL QUALITY RATING OF CO-OP STUDENTS ON CO-OP PROGRAM BY SAMPLE[1]

CHARACTERISTICS		NUMBER	MEAN SCORE
Total		1154	3.918
Sample:	Rate of Return	569	3.815
	Previous Experience	373	3.944
	Missing Graduate Data	212	4.146

[1] Ratings were on a 5-point scale with a score of (1) equalling "poor" and a score of (5) equalling "excellent."

TABLE 2.72: QUALITY RATING OF CO-OP STUDENTS ON CO-OP COLLEGE INSTRUCTION BY SEX[1]

CHARACTERISTICS		NUMBER	MEAN SCORE
Total		1355	3.819
Sex:	Male	875	3.769
	Female	480	3.912

[1] Ratings were on a 5-point scale with a score of (1) equalling "poor" and a score of (5) equalling "excellent."

A similar result was obtained with item 7. Table 2.73 indicates that females systematically rate co-op programs better in their placement of students in jobs than do males. Again, no underlying factors for this result becomes evident. The only other significant differences by strata were those among the samples. In this instance the mean scores were about the same for those students attending schools for which data were obtained, but both samples were below the mean score expressed by students in the Missing Graduate Data Sample.

TABLE 2.73: CO-OP STUDENT RATING OF PLACEMENT OF STUDENTS IN CO-OP WORK BY SAMPLE AND SEX[1]

CHARACTERISTICS		NUMBER	MEAN SCORE
Total		1140	3.544
Sample:	Rate of Return	568	3.491
	Previous Experience	360	3.481
	Missing Graduate Data	212	3.792
Sex:	Male	862	3.474
	Female	472	3.686

[1] Ratings were on a 5-point scale with a score of (1) equalling "poor" and a score of (5) equalling "excellent."

Turning to the placement of program graduates (Table 2.74) does not show a significant difference between the sex strata, but does by sample, discipline area, program length, unemployment level, ownership, and race. The stratification by sample this time indicates that those students with previous experience do not rate the co-op program as high in placing graduates as do students without previous experience. This is probably because the former use their own, previously established channels for placement and have less need for co-op proggram placement efforts.

It is interesting that non-Whites, those in private schools, and students attending schools in low unemployment areas

X

TABLE 2.74: CO-OP STUDENT RATING OF PLACEMENT OF GRADUATES BY SELECTED CHARACTERISTICS[1]

CHARACTERISTICS		NUMBER	MEAN SCORE
Total		1026	3.419
Sample:	Rate of Return	551	3.506
	Previous Experience	326	3.206
	Missing Graduate Data	199	3.528
Discipline Area:			
	Engineering & Architecture	329	3.684
	Business & Management	477	3.382
	Health Professions	54	3.481
	Liberal Arts	269	3.082
	Trade & Industrial	85	3.376
Program Length:	2-year	632	3.231
	4-year	369	3.512
	5-year	263	3.700
Unemployment Level:	High	643	3.333
	Low	601	3.496
Ownership:	Public	1003	3.338
	Private	261	3.690
Race:	White	992	3.371
	Non-White	258	3.574

[1] Ratings were on a 5-point scale with a score of (1) equalling "poor" and a score of (5) equalling "excellent."

have systematically higher opinions of their schools' placement efforts. It is also very interesting that this appreciation increases systematically with the length of the co-op program. Apparently, this squares with the significant difference among discipline areas. Table 2.74 shows that Engineering & Architecture (typically the longer programs) have the highest regard for the placement attributes of the co-op program, whereas Liberal Arts is also the least vocational of all the discipline areas, and probably engenders the most placement problems.

Tabulations of the ratings of the relevance of the co-op class work to the co-op work experience (item 3) as shown on Table 2.75 indicate that significantly different results are obtained for a number of different stratification schemes. Females, again, score co-op programs higher in this regard. This may be because of the extremely high mean score obtained for the predominantly female Health Professions and the low score of the predominantly male Engineering & Architecture. It is additionally found that students in public schools rate the relevancy of the class work higher than those in private schools. While this phenomenon is not explained by discipline area differences, the decline in the mean score as the length of program increases is. Note that Health Professions is typically a 2-year program, whereas Engineering & Architecture is

TABLE 2.75: CO-OP STUDENT RATING OF RELEVANCE OF CO-OP CLASS WORK TO CO-OP WORK EXPERIENCE BY SELECTED CHARACTERISTICS[1]

CHARACTERISTICS	NUMBER	MEAN SCORE
Total	1150	3.513
Sample: Rate of Return	569	3.385
Previous Experience	371	3.671
Missing Graduate Data	210	3.581
Sex: Male	872	3.439
Female	474	3.662
Discipline Area:		
Engineering & Architecture	340	3.229
Business & Management	507	3.607
Health Professions	59	4.000
Liberal Arts	298	3.614
Trade & Industrial	89	3.562
Program Length: 2-year	685	3.699
4-year	393	3.384
5-year	269	3.245
Ownership: Public	1080	3.615
Private	267	3.120

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[1] Ratings were on a 5-point scale with a score of (1) equalling "poor" and a score of (5) equalling "excellent."

usually four years in length, and often five years in length. Finally those students with previous experience provide higher ratings to the relevance of their class work to their co-op jobs than do students without previous experience. This may be a reflection of the student with previous experience being better equipped to judge the relevance of the class work.

The last item to be discussed, and the one for which the most strata produced significant differences, is the value of co-op counseling in career education. Table 2.76 shows the pattern of a higher rating by females and non-Whites prevails again. As before, at least the sex difference is explained by the high ratings for Health Professions and the low ratings for Engineering & Architecture. These discipline area differences are also effective in explaining the decline in scores as the program length increases.

Public schools and schools in low unemployment areas also tend to endow students with a higher regard for the effectiveness of the career counseling efforts of the co-op program, but the explanation for this familiar pattern is not readily apparent. By the same token, the reasons for the high rating in the South and the low rating in the Northeast are probably because Engineering & Architecture is a major program in the Northeast, and Health Professions is common in the South. Finally, the pattern established earlier of the score increasing as one moves from the Rate of Return Sample to the Previous Experience Sample to the Missing Graduate Data Sample is repeated for this section.

d. Student Recommendations

As a followup to the quality ratings above, students were asked whether they would recommend the co-op programs to all, some, or none of the other undergraduates. As shown on Table 2.77 almost two-thirds of the students responded that they would recommend the co-op program to all undergraduates, and less than 3 percent indicated that they would not recommend the program. This is a very strong testimony for the co-op programs, and confirms the quality ratings, above.

TABLE 2.76: CO-OP STUDENT RATING OF QUALITY OF CO-OP COUNSELING IN CAREER PLANNING BY SELECTED CHARACTERISTICS[1]

CHARACTERISTICS		NUMBER	MEAN SCORE
Total		1148	3.199
Sample:	Rate of Return	571	3.033
	Previous Experience	366	3.320
	Missing Graduate Data	211	3.436
Sex:	Male	871	3.150
	Female	476	3.349
Discipline Area:			
	Engineering & Architecture	342	2.939
	Business & Management	508	3.319
	Health Professions	59	3.356
	Liberal Arts	295	3.329
	Trade & Industrial	90	3.278
Program Length:	2-year	682	3.371
	4-year	397	3.088
	5-year	269	3.030
Region:	Northeast	309	2.896
	North Central	212	3.184
	South	538	3.370
	West	289	3.311
Unemployment Level:	High	715	3.141
	Low	633	3.308
Ownership:	Public	1080	3.306
	Private	268	2.869
Race:	White	1063	3.150
	Non-White	270	3.511

[1] Ratings were on a 5-point scale with a score of (1) equalling "poor" and a score of (5) equalling "excellent."

When stratified by sample, sex, discipline area, program length, region, unemployment level, ownership, race, and parental income, only those strata shown on Table 2.77 displayed significant differences in the distributions of responses at a 95 percent level of confidence (using a Chi Square test). While substantially

TABLE 2.77: PROPENSITY OF CO-OP STUDENTS TO RECOMMEND THE CO-OP PROGRAM TO OTHERS BY SELECTED CHARACTERISTICS[1]

CHARACTERISTICS	RECOMMENDATION		
	ALL	SOME	NONE
Total	63.7	33.6	2.6
Sample: Rate of Return	62.9	33.1	4.0
Previous Experience	59.3	39.2	1.6
Missing Graduate Data	73.7	25.3	0.9
Sex: Male	60.5	37.8	1.7
Female	68.5	28.0	3.5
Program Length: 2-year	61.1	36.1	2.9
4-year	68.2	29.4	2.5
5-year	62.0	37.2	0.7
Region: Northeast	56.1	38.0	5.9
North Central	66.4	31.3	2.3
South	68.0	30.7	1.3
West	60.4	39.2	0.3
Unemployment: High	59.1	37.1	3.8
Low	68.2	31.2	0.6

[1] All figures are percentages; all results shown are significantly different at a 95 percent level of confidence as determined through Chi Square tests.

fewer of those students with previous experience indicated they would recommend co-op to "all" other students, sufficiently more of them indicated that they would recommend co-op to "some" other students that only an average proportion took a no-recommendation attitude. By far, the most favorable response was from students in the Missing Graduate Data Sample, who indicated by almost 3 to 1 that they would recommend co-op to all students and less than 1 percent would not recommend co-op to others.

Recommendations are far superior from students in low unemployment areas, but the male-female comparison is mixed. More females would give an unqualified recommendation, but more males would give a qualified recommendation, so that females actually respond proportionately more often they would not recommend the co-op program to others. By the same token, the program length and region comparisons are mixed. Four-year programs and those in the South and North Central contain students who highly recommended co-op in larger proportions, whereas these student populations also provide qualified recommendations the least often. As a result, 5-year programs and programs in the West end up with the smallest proportion of students who would not recommend the co-op experience to others.

E. Summary of the Student Experience

Examination of the student experience produced results which were entirely consistent with the findings in the rate of return analysis of Section I. This means that the rate of return findings are consistent with both the graduate and the student experiences, and that both play significant and complementary roles in establishing the rates of return. Thus, it is clear that not only does cooperative education generally lead to increased earnings of the program graduates, but that it serves as a student aid device in most instances.

Some quick calculations will indicate that the advantage to co-op participation in terms of processing returns, are about evenly divided between co-op serving as a financial aid device and the increased earnings of co-op graduates. Comparing the three-year graduate earnings of co-op and non-co-op graduates on Table 2.13 shows an advantage to co-op of $6,729 in 1969 dollars. In addition, co-op graduates are observed to obtain initial employment .84 months sooner from Table 2.19. Using the wage information from Table 2.13, this converts to an advantage for co-op graduates of $239, bringing the three year total advantage for co-op graduates to $6,968. Turning to Table 2.35 we find that student net benefits (excluding consideration of foregone earnings) average $1,360 higher in 1976 dollars annually for co-op students than non-co-op students. Using a 4-year program as typical, the advantage grows to $5,440. The total advantage for those who participate in co-op over the first seven years approximates $12,408, of which 44 percent is attributable to the student experience (i.e., the financial aid function of co-op). This percentage is a maximum estimate because the graduate earnings are in 1969 rather than 1976 dollars, and the graduate earning differential may persist beyond the first three years of the graduate experience. Nevertheless, the duration from this maximum is probably not large once the influence of discounting is considered.

Closer examination of the individual components of the student costs and benefits indicated that co-op students had a much more favorable relationship of pecuniary benefits to costs during the school years than did non-co-op students. In fact, combining the costs and benefits considered, non-co-op students generally experienced an annual negative out-of-pocket cash flow. Of all students though, those with previous experience (primarily veterans) were placed in the worst financial position during the school years, in spite of the substantial reporting of G.I. Benefits. This is due primarily to the increased costs of living as a result of the family responsibilities they have. The presence of co-op earnings for these students was just sufficient to escape the sizeable negative cash flow typical of non-co-op students with previous experience. These findings indicate that, in spite of significantly higher graduate earnings, the net returns college investment for students with previous experience are likely to be below those of co-op students without previous experience, and may even be below those for non-co-op student without previous experience.

At the same time, the findings with respect to the Missing Graduate Data Sample (which is largely composed of students from new programs) may indicate that future rates of return for cooperative education may grow as the program expands, but the growth will not be sufficient to provide returns to the new programs (e.g., Liberal Arts) that are on a par with those in more established programs (e.g., Engineering & Architecture). Much more likely though is that the positive co-op/non-co-op differential could be reduced somewhat, and the negative previous experience/no previous experience differential could grow. This conclusion, of course, assumes that the Missing Graduate Data Sample accurately portrays future co-op and non-co-op students, and that the change in the out-of-pocket cash position of students is eventually reflected in changes in the rate of return (a result which is highly problematical in view of the variability of the data.)

One additional interesting non-pecuniary "cost" comparison was that between hours spent in school-related activities as opposed to hours spent at work. A definite tradeoff exists between the hours spent at these two activities. For example, while students without previous experience spend a great deal more time in school activities, they also spend considerably less time at work. This finding holds regardless of the co-op status of the student. Such a time tradeoff is also observed for virtually every stratum separately examined. In addition, whenever a comparison was made between attributes of a characteristic (e.g., White and non-White, public and private) and a difference was observed for one of the activities (e.g., Whites spend more time at work than non-Whites), the reverse difference was observed for the other activity (e.g., Whites spend less time at school than non-Whites). Thus, leisure time seems to be fairly constant, although some devote substantially more of the remaining time (non-leisure time) to work and less to school than others).

The examination of student attitudes and experiences also uncovers some important and interesting co-op/non-co-op differences. Five advantages have been alleged for co-op participation. These advantages range from providing opportunities to try a variety of jobs and a chance to assume responsibility to making money to pay for college expenses and increasing the chances of getting a good job upon graduation. In each case, the co-op student indicated that the consideration was more important than did the non-co-op student. The only strata for which this relationship did not hold was for those students with previous experience and students in the discipline areas of

Trade and Industrial and Health Professions. On the other hand, the co-op/non-co-op difference was very strong for non-White students and students in private schools.

These student responses, in general, are consistent with the findings regarding the level of overall satisfaction with the school program and the matching of the student work to the major. Co-op students did indicate a higher levels of satisfaction with the school program than non-co-op students, but the co-op/non-co-op differential was not strong (both student groups were highly satisfied). On the other hand, co-op students overwhelmingly indicated a strong relationship between the student job and the college major compared to non-co-op students. Thus, while the overall satisfaction with the college program was only marginally higher for co-op students, the relevance of the student job to the major was clearly better in the co-op programs.

When asked to describe the student job experience (both satisfaction and performance), the response patterns were significantly different between co-op and non-co-op students in eight out of the ten cases. Apparently both type of students get to decide how things should get done on the job and get asked their opinions about work with about the same frequency. On the other hand, significantly fewer co-op students can do their jobs without thinking, associate with fellow workers after hours, or require a replacement when absent. This indicates that co-op students are not in the mainstream. That is, they are given jobs that are specialized, not routine, generally postponable and require independent thinking. This conclusion is also consistent with the findings that co-op students more often learn something new each day, learn things after work, are told they have done a good job, receive multiple assignments, and get paid less.

Nine of these questions were also asked of program graduates as reported in Section I. A comparison of the graduate and student responses indicates that the co-op participant continues to receive multiple job assignments more often, and require replacements when absent less often after graduation. Other than these, the co-op graudates are differentiable from non-co-op graduates only in that co-op graduates begin to be asked their opinions about the job more often than non-co-op graduates.

Finally, the analysis focused on co-op students, their reasons for participation, their ratings of the quality of the programs, and their propensities to recommend co-op participation to other students. The reasons most cited for co-op participation was the possibility of obtaining skills related to the career objective. The least often reasons cited are those which suggest that the added income from co-op participation is important. Co-op income is not considered very important regardless of whether such income is necessary for continued education or only desirable. Thus, while co-op income is certainly a real and positive attribute of the co-op experience, other attributes rank higher in the students' set of preferences.

The student ratings of the quality of their programs, according to ten program characteristics, produces several interesting findings. The co-op programs are rated "above average" according to all 10 characteristics; but the adequacy of the employers' facilities, the quality of employer training, the quality of college instruction, and the overall program quality rating were rated the highest of the 10; whereas counseling for career planning received the lowest mean rating. Consideration of these rating items by various strata indicated that those with previous experience and those in new programs better appreciate the co-op structure of education. (Their ratings of the programs, in terms of the quality of employer training and overall quality of the co-op programs, were significantly higher than other students).

Lastly, when co-op students were asked whether they would recommend the co-op program to other students, less than 3 percent indicated that they would not recommend the program to others, whereas almost two-thirds indicated that they would recommend co-op to all other students. This is an extremely strong testimony to the preference of students for cooperative education.

III. ANALYSIS OF INSTITUTIONAL COSTS AND BENEFITS

Introduction

The purpose of this section is to examine the costs and benefits of postsecondary cooperative education as they impact upon the academic institution. There are four major issues to be addressed:

- What are the incremental costs specifically attributable to co-op programs?
- What are the incremental benefits of co-op programs to participating institutions?
- How do the incremental institutional costs and benefits attributable to co-op programs compare?
- How do selected qualitative cost components vary by program characteristics?

It should be noted that the goal of this section is not to measure total program costs and benefits, but rather to measure only those that are realized by the institution as a direct result of the cooperative education program. The central question then is, does the cooperative education program generate revenues sufficient to cover the costs added by the program from the point of view of the institution?

It should also be noted that it was not possible to obtain adequate measures of all types of cost. For example, it would have been desirable to measure personnel costs, materials and supplies, capital costs, travel, telephone, etc. necessitated by the program over and above the normal expected educational costs in a non-co-op program. Unfortunately, only part of the personnel costs were directly measured. The impact on the cost and benefit comparisons of this analytical limitation will be discussed during the cost-benefit comparisons.

Ordinarily, one would presume that the above cost limitations would result in net incremental cost-benefit comparisons that were biased in favor of cooperative education programs. While the costs are certainly biased downward, such is also the case with the benefit measures. Accurate lump sum co-op funding and measures of tuition received by the institution while the student is undertaking his work experience are readily available, but corresponding measures of other average daily attendance (ADA) funding were not available.[1] This means that, in many instances, the added revenues associated with the conduct of a cooperative education program are also biased downward. Therefore, the direction of bias of the net benefit-cost figure is unknown, it depends on whether the downward bias is greater for the costs or the benefits. Fortunately, the magnitude of the cost bias can be approximated so that a net cost-benefit figure can be generated which presents an a fortiori argument for the implementation of a cooperative education program by the institution. The nature of this argument will be discussed in-depth at the end of this section.

Another analytical problem which requires preliminary discussion is the use of the term "program." Throughout this chapter, the question of whether program meant the combination of all cooperative education activities for a single institution or the activities associated with cooperative education in a single discipline area for an institution either has been clear from the context in which it was used or has been unimportant. In this section, the distinction is critical.

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[1] ADA funds are those funds supplied by a governmental jurisdiction to schools on the basis of their reported attendance. If co-op students are counted as "attending" when engaged in this co-op work activities, then the receipt of this portion of ADA funding is a benefit accruing to the existence of the co-op program just as was tuition. Such funding is much more prevalent in the 2-year public postsecondary institutions although, if 4-year public schools justify budgetary increases on the basis of increased attendance, the incremental increase could be thought of as ADA funding. At this point in the analysis, however, the question is moot because such data are not currently available. See the further discussion on this source of revenue, below.

Optimally, the analysis should be conducted in terms of a single discipline area, but only the analysis of recorded initial set-up costs does so. For all other costs, the problem of joint costs and the untraceability of costs among discipline areas with the present data base precludes discipline area specific analyses. Except for the initial set-up costs then, the analyses are conducted in terms of institution-wide co-op activities, and the data represent a mix of discipline area specific co-op activities. Unfortunately, the mix of discipline areas within a single institution is not separately known for each cost item, so that the bias when adding cost elements and benefit elements cannot be determined with the present data base.

Finally, because of the unique sets of characteristics and situations among the schools in the sample, these data displayed very high degrees of variability. For this reason, truncated means were used to measure the typical cost and benefit components. That is, extreme values or outliers were eliminated from the analysis of selected cost and benefit components. Most of the truncation involved discussions as to whether non-responses were to be considered as zero responses or excluded from the tabulations, but a total of three schools was removed from the analysis of this section because of extremely high reported values in one or more cost or benefit categories. Since the sample sizes are fairly small, such obvious outliers would have unduly influenced the calculation of means, and it was felt that comparisons of truncated means would be preferable to a comparison of medians which are not influenced by extreme values. The nature of the cost specific truncations will be indicated below for each cost and benefit component.

The remainder of Section III will be divided into three subsections. Subsection A will deal specifically with incremental institutional personnel costs which are the direct result of co-op program participation. These costs are divided into three categories: initial program set-up costs, annual fixed costs, and annual variable costs. Subsection B will similarly deal with institutional benefits which are the result of co-op participation. Subsection C will make comparisons between the incremental costs identified in Subsection A and the incremental benefit measures presented in Subsection B.

A. Analysis of Institutional Costs

This subsection will investigate the various component costs which impact upon the academic institution as a result of its participation in cooperative education. Most of these costs are based upon responses to questionnaire items by faculty, co-op directors, fiscal officers, and senior academic officials. Cost elements which will be examined include:

- Initial Set-up Costs;
- Annual Fixed Costs
  - Co-op Director's Salary;
- Variable Costs:
  - Costs of Co-op Placement Services,
  - Costs of Co-op Counseling Services,
  - Faculty time involved in on-site activities and employer contact, and
  - Co-op personnel costs.

The manner in which these average component costs vary with various program or institutional characteristics will also be examined. The characteristics used in this analysis are as follows: presence or absence of IV-D funding, 4-year versus 2-year, public versus private ownership, co-op program age, high versus low State unemployment rate (above and below median unemployment rate for the nation) and co-op program enrollment (categorized into tertiles).

1. Initial Set-up Costs

The cost of establishing a co-op program (i.e., in this case, for a particular discipline area) is an important element of the total cost of operating a program of cooperative education. The co-op directors were asked to estimate the number of staff person-weeks devoted to various set-up activities by several categories of personnel for the most recently initiated co-op discipline area. These estimated levels of effort were multiplied by the corresponding mean 1975-76 salary figures in each school (as reported by the fiscal officers in our sample), in order to estimate the personnel cost associated with these start-up activities. Table 2.78 shows that, for the total sample, a mean total personnel cost of $8613 was utilized in staff efforts for program design, materials development, evaluation design, faculty training, employer contacts, curriculum revision, and other start-up activities. Note that it was not possible to measure the total non-personnel costs associated with the establishment of a new program, so that these figures represent minimum cost levels.

When looked at in relation to different institutional types, the most notable differences are between 2-year and 4-year and between programs in High and Low unemployment states. Clearly, the 4-year and the High unemployment state programs have incurred higher set-up costs than the 2-year and the Low unemployment state programs. These results are due to two factors. First, 4-year schools spend, on average, over twice the length of time in start-up activities than do 2-year schools (i.e., 11 months versus only 5 months). Secondly, since programs in High unemployment states are likely to have greater difficulty in recruiting an initial pool of employers, it is not surprising that they devote more resources to these start-up activities. Table 2.78 also shows that IV-D schools have slightly higher start-up costs than do non-IV-D institutions. Almost no differences were found in terms of ownership or program age. Also, schools in the high enrollment group tended to have higher set-up costs.

In terms of the actual personnel efforts involved, the overall cost for set-up activities of $8613 represents about 23 person-weeks of staff time, over half of which (i.e., 13 weeks) was the work of the co-op director. From another question asked of the co-op director, we have found that the mean length of time over which these start-up activities take place is about eight months. Thus, in the typical

TABLE 2.78: MEAN CO-OP PROGRAM SET-UP COSTS BY INSTITUTIONAL CHARACTERISTICS[1]

CHARACTERISTICS	TOTAL SET-UP COST	
	Number[3]	Mean
Total	53	8,613
IV-D Funding:		
Yes	35	9,455
No	18	6,976
Program Length:		
2-Year	29	6,110
4-Year	24	11,638
Ownership:		
Public	43	8,629
Private	10	8,541
Program Age:		
Old[2]	32	8,822
New	20	8,623
Unemployment:		
High	26	11,000
Low	27	6,315
Co-op Enrollment:		
Less than 80 students	17	8,446
80-219 students	18	6,076
220 or more	15	13,069
Discipline Area:		
Engineering & Architecture	6	4,850
Business & Management	14	11,941
Health Professions	3	7,262
Liberal Arts	12	5,648
Trade & Industrial	4	6,538

[1] Measured in 1975-76 dollars; program means discipline area for these figures; all zero values excluded.

[2] An Old program is defined as one which admitted its first students prior to the 1974-75 academic year.

[3] Number of institutions for which means were calculated.

school, a co-op program for a new discipline area could be initiated with less than the full-time effort of one individual over the course of two semesters.

Separate tabulations were run by discipline area and, while there was considerable variation among the figures reported, the extremely small number of observations and the high variance within discipline areas (i.e., standard deviations larger than the means) rendered the differences insignificant at a 95 percent level of confidence. It is interesting to note the predominance of Business & Management and Liberal Arts in the program for which data were obtained on start-up costs, and the high cost for Business & Management discipline areas that these data show. These figures do not hold any implications for the following cost data which are not specific to program area (i.e., they are school specific and each school has its own mix of discipline areas covered by co-op).

2. Annual Fixed Costs - Co-op Director Salary

In most schools, what usually turns out to be the single most significant personnel cost in the operation of a co-op program (i.e., the combination of programs in the school) is the salary of the co-op director. While over the years, this cost is likely to vary significantly, it can be regarded as fixed in the short run and not subject to vary as the program enrollment changes marginally. As seen in Table 2.79, the annual costs for this element of co-op program operation in the overall sample is $10,632.[1] This represents one individual devoting more than half-time to co-op activities. In IV-D schools, there is typically the equivalent of a three-quarter-time person directing the co-op program, which results in a cost to institutions of this type of $13,600. Non-IV-D schools are much more likely to have no director at all. In those schools, the mean cost is therefore only

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[1] A single school with an extreme value for this cost component was dropped from the analysis. All schools reported a cost range between $3096 and $72,500, except one with a reported cost of $300,000. This outlier was dropped from the analysis.

TABLE 2.79: MEAN ANNUAL CO-OP DIRECTOR SALARY COSTS BY INSTITUTION CHARACTERISTICS[1]

CHARACTERISTICS	MEAN FIXED COST		
	Number[3]	Total	Per Student
Total	77	10,632	132
IV-D Funding			
Yes	41	13,630	130
No	36	7,217	135
Program Length:			
2-Year	40	10,540	113
4-Year	37	10,731	152
Ownership:			
Public	66	9,551	113
Private	11	17,118	222
Program Age:			
Old[2]	50	11,219	93
New	25	9,787	182
Unemployment:			
High	38	13,364	168
Low	39	7,970	98
Co-op Enrollment:			
Less than 80 students	22	10,341	243
80-219 students	23	14,210	113
220 or more	19	12,529	26

[1] Measured in 1975-76 dollars; all zero values included.

[2] An Old program is defined as one which admitted its first students prior to the 1974-75 academic year.

[3] Number of institutions for which means were calculated.

$7,217. Private schools also have higher costs attributable to this factor than do Public schools, as do schools in States with High unemployment.

Since this component represents a fixed cost for co-op program operation, there is little overall difference in total cost among programs of different enrollment sizes, although per student costs drop significantly (as expected of a fixed cost) as program size increases. The much higher fixed cost in IV-D schools is not surprising. Since the usual grant of $25,000-$30,000 is sufficient to cover the cost of a co-op director, and perhaps some clerical support, this has become the typical use for the IV-D grant (see Chapter 4). However, an explanation for the higher amount spent in this regard by Private schools is not immediately apparent. As will be seen, their costs are less for faculty time devoted to co-op activities. Thus, the Private schools may have structured the programs such that most activities are centralized in the role of the co-op director. The higher costs for this component among schools located in States with high unemployment we would hypothesize to be due to a need for greater effort in employer recruitment which would often mandate a full-time director with a significant amount of time available for such activities.

3. Annual Variable Costs

Annual variable costs are those costs needed to operate a co-op program, which are expected to be a function of (i.e., vary directly with) co-op student enrollment. For schools with co-op programs, these variable costs may be divided into two general categories. First, there are the costs associated with the provision of ancillary services to the students enrolled in the co-op programs. The personnel component in this category of variable cost can be further subdivided into two specific areas of program services: placement and counseling. The second major personnel variable cost category is the faculty time spent in employer contact that is needed over and above the efforts of the co-op director in this regard. Each of these specific personnel variable cost components - placement, counseling, and faculty time - will be discussed individually and combined and will be expressed in terms of costs per student. It should be kept in mind that all costs are incremental, that is, are a direct result of the co-op program over and above the costs associated with non-co-op education.

a. Annual Placement Costs

The first category of personnel variable costs to be considered is that for placement specialists hired or used specifically for the co-op program. While in most schools with co-op programs the bulk of the placement activities are conducted by the co-op director or the school's regular placement office, some programs have additional placement specialists for students enrolled in the co-op program. Table 2.80 shows that the typical cost per student for this function is $67. Schools with IV-D funding have higher costs for this component than do the non-IV-D schools. We would suspect that this difference is due to the availability of this additional funding for co-op which would enable the hiring of co-op placement specialists more frequently than in schools without such funds. New programs, and programs in 2-year schools (which tend to be newer) also have higher per student costs in this regard. It is interesting to note that the Private schools in our sample never provide this additional placement activity for co-op students. However, as noted previously, the Private schools devote more resources to the position of co-op director. We would therefore hypothesize that in these schools the co-op director is more able to provide all needed placement activities without the assistance of additional personnel.

Surprisingly, the placement costs are much higher in programs located in states with low levels of unemployment. While the difference is not statistically significant, it was thought that the difference was due either to the distribution of Public and Private schools or Old and New programs. Separate tabulations showed, however, that neither influence was sufficient to explain the observed

TABLE 2.80: MEAN ANNUAL PER STUDENT INCREMENTAL PLACEMENT COST BY INSTITUTIONAL CHARACTERISTICS[1]

CHARACTERISTICS	PER STUDENT PLACEMENT COSTS	
	Number[3]	Mean
Total	56	67
IV-D Funding:		
Yes	33	107
No	23	9
Program Length:		
2-Year	26	98
4-Year	30	40
Ownership:		
Public	45	83
Private	11	0
Program Age:		
Old[2]	36	35
New	19	132
Unemployment:		
High	28	14
Low	28	120
Co-op Enrollment:		
Less than 80 students	22	119
80-219 students	22	49
220 or more	13	13

[1] Measured in 1975-76 dollars; all zero values are included, but non-responses are excluded.

[2] An Old program is defined as one which admitted its first students prior to the 1974-75 academic year.

[3] Number of institutions for which means were calculated.

differences. In the relationship of cost to program size, we find that per student co-op specific placement costs decrease with increasing enrollment so that such costs increase less than proportionally as the size of the co-op program increases.

b. Annual Counseling Costs

While all students receive some forms of counseling regardless of their co-op status, co-op programs often claim to provide additional counseling, especially in the area of career development. Between 87 and 89 percent of the co-op directors said their programs provided co-op students with general career counseling, with work experience counseling, with academic counseling, and with personal counseling. What is important to this analysis, however, is whether there is any increased level of effort involved in the counseling of co-op students as compared to the counseling regularly provided to any student.

To address this issue, co-op directors were asked the number of hours per year of counseling of any type received both by co-op students and by non-co-op students alike. Any differential between these two reports would represent the co-op specific costs of this component of program operation. In the typical school, the mean level of effort in this regard was 11.3 hours per student each year for co-op students and 6.6 hours per year for non-co-op students. Thus, the costs for counseling attributable to the operation of a co-op program would be 4.7 hours of additional effort multiplied by the mean hourly salary earned by those personnel providing the counseling services. Since several different categories of personnel provided these services (i.e., co-op director, faculty, and counselors), and since the relative proportion provided by each is not known, the mean salary of a counselor, as reported by the fiscal officers, was used.

As seen in Table 2.81, in the overall sample, $49 was the per student cost attributable to counseling of co-op students over and above that expended on behalf of non-co-op students. There were

TABLE 2.81: MEAN ANNUAL PER STUDENT INCREMENTAL COUNSELING COSTS BY INSTITUTIONAL CHARACTERISTICS[1]

CHARACTERISTICS	PER STUDENT COUNSELING COSTS	
	Number[3]	Mean
Total	66	49
IV-D Funding:		
Yes	37	46
No	29	53
Program Length:		
2-Year	35	41
4-Year	31	58
Ownership		
Public	56	45
Private	10	72
Program Age:		
Old[2]	41	48
New	23	48
Unemployment:		
High	32	60
Low	34	40
Co-op Enrollment:		
Less than 80 students	20	57
80-219 students	19	47
220 or more	17	50

[1] Measured in 1975-76 dollars; all zero values are included, but non-responses are excluded.

[2] An Old program is defined as one which admitted its first students prior to the 1974-75 academic year.

[3] Number of institutions for which means were calculated.

very few sizeable differences in these costs by institution type. The most notable difference was between Public and Private schools, with Private expending more than half again as much per student for counseling than was the case in Public institutions. It should be noted that the difference in costs between these two categories of schools is a function of the additional hours of counseling received by co-op students in Private schools, and not due to salary differentials.[1] Table 2.81 also shows that the co-op specific counseling costs tend to increase almost proportionately as the size of the co-op enrollment increases.

c. Annual Faculty Time Costs

While most faculty activities are no different for co-op or non-co-op students, time spent contacting employers and time spent in on-site visits to work locations to evaluate students' work experiences do constitute a personnel cost which is specifically attributable to the existence and operation of a co-op. Faculty members interviewed were asked to estimate the proportion of their time so used devoted to these activities. These data were used in conjunction with the faculty salaries reported by the fiscal officer to estimate this cost of co-op program operation. As seen in Table 2.82, added faculty time represents an annual per student cost of $33 in the typical school. The opposite trend from that seen with co-op director costs is found for faculty cost in relation to institution ownership. Public institutions have somewhat higher costs for faculty time in these activities than do Private schools. This may indicate different strategies for carrying out employer contact and on-site evaluation activities in different types of schools, with Private schools centralizing these functions in the co-op director's role and

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[1] It should be noted that since counseling can be (and often is) undertaken by the co-op director, there may be some double counting of the co-op director's time in these figures, especially for Private schools where the co-op director's time is much higher.

TABLE 2.82: MEAN ANNUAL INCREMENTAL FACULTY TIME COST PER STUDENT BY INSTITUTIONAL CHARACTERISTICS[1]

CHARACTERISTICS	PER STUDENT FACULTY COST	
	Number[3]	Mean
Total	57	33
IV-D Funding:		
Yes	41	35
No	16	31
Program Length:		
2-Year	30	40
4-Year	27	27
Ownership:		
Public	45	36
Private	12	23
Program Age:		
Old[2]	37	24
New	20	50
Unemployment:		
High	27	26
Low	30	40
Co-op Enrollment:		
Less than 80 students	19	59
80-219 students	20	20
220 or more	18	21

[1] Measured in 1975-76 dollars; all zero values are included, but non-responses were excluded.

[2] An Old program is defined as one which admitted its first students prior to the 1974-75 academic year.

[3] Number of institutions for which means were calculated.

Public schools dispersing more of these types of activities among the faculty. On the other hand, it appears as if the faculty in New programs spends about twice as much effort per student on these types of activities as do those in Old programs in spite of a much greater level of effort on the part of the co-op directors in the newer programs. Finally, costs for this component of co-op program operations show a sharp decline on a per student basis, as program enrollment increases beyond the smallest enrollment category. This indicates that such costs do not increase proportionally with program size.

d. Total Annual Variable Costs

Combining the three preceding cost components (placement, counseling, and faculty time) represent those incremental personnel costs which are likely to vary directly with program size. As seen from Table 2.83, the combined annual incremental variable cost for these personnel functions in the typical school amounts to $149 per student. As was true for most of the separate components, New programs, IV-D programs, and programs in Public institutions have higher overall per student variable costs. At the same time, 2-year schools and schools with co-op programs in Low unemployment states have higher annual incremental variable personnel costs. This latter result is due to the previously mentioned anomaly with placement costs. In terms of program size, combined per student variable costs steadily decrease as the total co-op enrollment increases. Thus, the annual personnel costs do not increase proportionally as co-op enrollment increases.

4. Total Annual Incremental Operating Costs

Once the initial set-up costs have been incurred and the program is underway, the total annual operating costs of a school's mix of co-op programs above those required for traditional educational programs can be found by summing the fixed and variable incremental components. In the present case, only the major incremental costs have been measured, but it is nevertheless instructive to ascertain

TABLE 2.83: TOTAL VARIABLE PER STUDENT COSTS BY INSTITUTIONAL CHARACTERISTICS[1]

CHARACTERISTICS	MEAN PER STUDENT VARIABLE COSTS
Total	149
IV-D Funding:	
Yes	188
No	93
Program Length:	
2-Year	179
4-Year	125
Ownership:	
Public	164
Private	95
Program Age:	
Old[2]	107
New	230
Unemployment:	
High	100
Low	200
Co-op Enrollment:	
Less than 80 students	235
80-219 students	116
220 or more	84

[1] Figures determined by summing the means of Tables 2.80, 2.81 and 2.82, rather than separately calculating means of totals, so that the number of schools responding is not relevant; measured in 1975-76 dollars.

[2] An Old program is defined as one which admitted its first students prior to the 1974-75 academic year.

these totals because they will provide some idea of the variations in the increased personnel costs which are the major program cost item. Table 2.84 presents the annual incremental personnel costs, or annual incremental operating costs, on both a total and a per student basis. For all schools combined, the annual personnel operating costs of a school's co-op programs is $22,633 or $281 per student more than that of a traditional or non-co-op program of the same size.

Schools receiving IV-D funding expend more dollars than non-IV-D schools, both in terms of total costs as well as on a per student basis. This is a function of both the co-op director's salary (a fixed cost), since IV-D schools are much more likely to have a full-time director for their co-op program, and the placement cost (a variable cost). In terms of total costs, 2-year schools have somewhat larger incremental operating costs, although, because 2-year programs tend to be larger, the costs in the two types of schools are almost equal on a per student basis. Co-op programs in Private schools have slightly higher operating costs on a per student basis, due to a greater likelihood of there being a full-time co-op director in Private as compared to Public institutions, and the smaller program sizes in Private schools. By the same token, while Old programs have slightly higher total incremental operating costs, because they are much larger, they actually have substantially lower per student costs of operation. Co-op programs in High unemployment States have almost the same total and per student incremental operating costs as those located in Low unemployment States.

As expected, annual incremental co-op operating costs (at least the personnel components) are highly related to co-op program size. Total costs increase monotonically with the number of students enrolled in the co-op program, although not proportionally. This is shown clearly on Figure 2.2 as per student costs drop continually as the program size increases. Thus, it is clear that very small programs must operate at higher costs because they have fewer students over which to spread the fixed cost components and are not able to take

TABLE 2.84: MEAN ANNUAL INCREMENTAL TOTAL AND PER STUDENT CO-OP OPERATING (SUM OF ANNUAL FIXED AND VARIABLE) COSTS BY INSTITUTIONAL CHARACTERISTICS[1]

CHARACTERISTICS	MEAN OPERATING COST	
	Total[2]	Per Student[3]
Total	22,633	281
IV-D Funding:		
Yes	33,341	318
No	12,189	228
Program Length:		
2-Year	27,236	292
4-Year	19,556	277
Ownership		
Public	23,413	277
Private	24,432	317
Program Age:		
Old[4]	24,127	200
New	22,155	412
Unemployment:		
High	21,319	268
Low	24,235	298
Co-op Enrollment:		
Less than 80 students	20,342	478
80-219 students	28,797	229
220 or more	53,007	110

[1] Measured in 1975-76 dollars; excludes initial program set-up costs.

[2] Mean total costs determined by summing the total fixed costs of Table 2.79 and the product of the combined per student variable costs of Table 2.83 and the ratio of the total to per student fixed costs of Table 2.79.

[3] Mean per student costs determined by summing the per student fixed costs of Table 2.79 and the per student variable costs of Table 2.83.

[4] An Old program is defined as one which admitted its first students prior to the 1974-75 academic year.

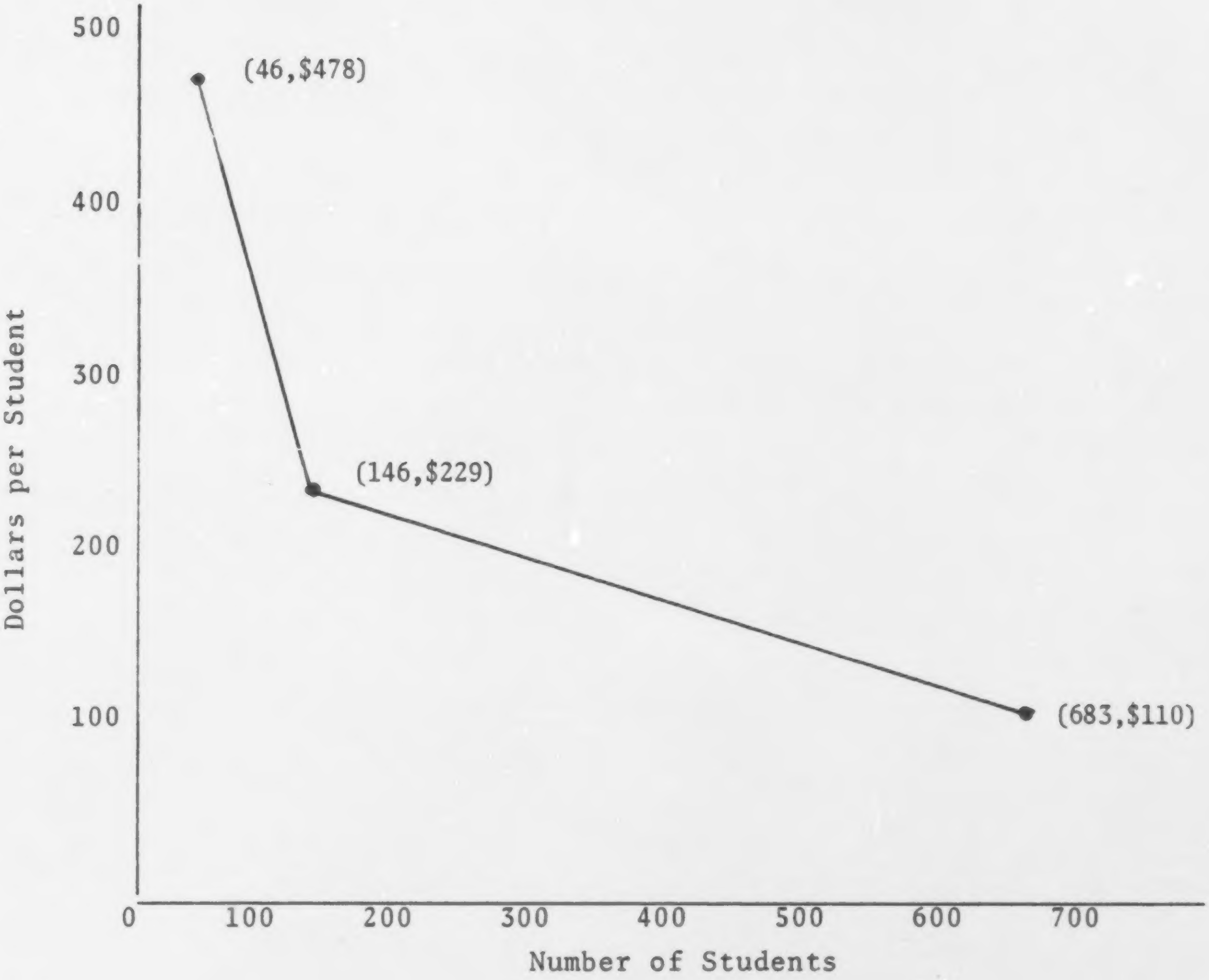

FIGURE 2.2: MEAN ANNUAL INCREMENTAL PER STUDENT CO-OP OPERATING COSTS BY MEAN PROGRAM ENROLLMENT IN EACH TERTILE SIZE GROUP

advantage of the reductions observed in some of the per student variable cost components. Due to the sparseness of the data and the limited range of program sizes in the sample, it was not possible to observe the program size at which the annual per student variable (and total) personnel costs begin to rise due to scale diseconomies.

B. Analysis of Annual Incremental Institutional Benefits

In this subsection, the financial benefits which accrue to institutions of higher education as a result of their participation in cooperative education will be described. There are two major categories of monetary benefits which accrue to institutions with cooperative education programs which may offset the costs described previously. The first of these are the IV-D funds and other revenues which are specifically earmarked for co-op. The second category of financial benefits stems from any tuition and/or Average Daily Attendance (ADA) support received during the period of the student's work experience. During this period, the student is not consuming resources at a level that would be consumed were he/she attending classes, so the support received for such "attendance" can be considered an incremental benefit to the institution. An indication of the typical levels of monetary benefits from those two factors is presented below.

1. Financial Benefits from Federal Funding

Monetary benefits which accrue to institutions as a result of their co-op participation can be divided into two categories: IV-D revenue and revenue from other sources specifically designated for co-op. The institutional fiscal officers were asked to quantify the amount of co-op funding from various sources and these were tabulated according to institutional characteristics, as shown in Table 2.85. For non-IV-D funds, the results were also broken down according to whether the institution also received IV-D funding. The results of the tabulations from the 30 schools where IV-D funds were present are shown in the first three columns of Table 2.85.[1] These figures

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[1] While both total per institution and per student figures are presented on Table 2.85, only the variations among the totals for each category are discussed here. Since these funds are received in a lump sum and not on a per student basis, the variations in the per student figures beyond those described in the totals are solely reflections of different mean program sizes among the categories. Their inclusion at this point is merely to facilitate the calculation of summary net revenue figures, below.

TABLE 2.85: MEAN TOTAL AND PER STUDENT ANNUAL INCREMENTAL FUNDING (IV-D AND OTHER FUNDING SPECIFICALLY EARMARKED FOR CO-OP) BY INSTITUTIONAL CHARACTERISTICS[1]

CHARACTERISTICS	IV-D GRANTS RECEIVED			OTHER FUNDING RECEIVED			TOTAL FUNDS RECEIVED[2]		
	Number[4]	Total	Per Student	Number[4]	Total	Per Student	Number[4]	Total	Per Student
Total	30	25,554	345	16	32,941	702	37	35,033	579
IV-D Funding:									
Yes	30	25,554	345	11	30,668	820	32	35,611	625
No	--	--	--	5	37,941	268	5	32,044	218
Program Length:									
2-Year	14	26,214	470	6	23,380	1438	17	30,193	860
4-Year	16	24,976	237	10	38,077	292	20	39,147	341
Ownership:									
Public	24	25,317	338	15	32,749	700	31	35,529	596
Private	6	26,500	375	1	35,824	716	6	32,471	494
Program Age:									
Old[3]	18	25,090	153	12	33,331	181	23	37,025	217
New	12	26,250	634	4	31,771	2003	14	31,760	1120
Unemployment:									
High	14	24,620	218	9	36,559	249	18	37,428	297
Low	16	26,371	456	7	28,289	1305	19	32,764	844
Co-op Enrollment:									
Less than 80 students	10	26,500	752	4	32,994	2068	13	30,733	1220
80-219 students	12	24,304	188	6	27,832	229	13	35,280	279
220 or more	8	26,246	74	4	30,218	44	9	36,760	85

[1] Measured in 1975-76 dollars; zero values excluded (i.e., only schools receiving such funds are included).

[2] Since those schools receiving one type of funding often do not receive the other type of funding, the totals (means) in this column are less than the sum of the totals (means) of the first two columns.

[3] An Old program is defined as one which admitted its first students prior to the 1974-75 academic year.

[4] Number of institutions for which the means were calculated.

indicate that while there were some minor differences by institutional characteristics, none of these variables was found to be a significant factor in determining the level of IV-D funds. Also note that these grants represent fixed benefits since their sizes are totally unrelated to the co-op program size.

In addition to Title IV-D funding for co-op, the fiscal officers in the sample were asked to enumerate funding from all the other sources which were specifically earmarked for the co-op program. These other earmarked funds are obtained from such sources as the Vocational Education Act (VEA), Title III of the Higher Education Act, selected State appropriations, some private funding sources, and other miscellaneous sources. Table 2.85 presents in column 2 the typical amounts of such funding by selected institutional characteristics for only those schools receiving some funds of this type (most schools in the sample did not receive any such funds).[1] When such other funds are received, 4-year schools, and those in High unemployment States receive somewhat greater amounts. As with the IV-D funds, there seems to be no relationship between the number of co-op students enrolled and the amount of co-op funding from non-IV-D sources.

For most schools, either IV-D or other co-op earmarked funds are received, but not both, and thus the means in the total funding column (column 3 of Table 2.85) are much less than the sum of the two means in the preceding IV-D funding and other funding columns. It is interesting to note that the influence of the non-IV-D funding was dominant in terms of relative magnitude of the total co-op fixed benefit funding. That is, even though High unemployment, Old, and 4-year programs typically receive somewhat less IV-D funding, the opposite trends with respect to non-IV-D funding carries over to the total fixed benefit funding where these program attributes are associated with somewhat higher funding levels. It is also interesting that Public schools typically receive less IV-D funding and less non-IV-D funding, but, when considering both types of funding combined, the Public school receives more funding. This is because more public schools attract both types of funding. In fact, only one Private school in the sample received non-IV-D funding especially for co-op. Apparently, many of these sources are not typically available to Private schools, because normally one would expect these schools to be more aggressive with respect to the acquisition of revenues. Finally, in spite of any observable relationship between program size and either type of funding, the combined funding shows a very weak but positive relationship with program size.

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[1] A single school with an extreme value for this revenue type was dropped from the analysis. All schools receiving such funds reported receipts within a range of $2,555 to $83,753, except one which reported receipts of over $700,000. This outlier was dropped from the analysis.

2. Tuition Savings

The other major financial benefit that can accrue to institutions offering cooperative education stems from the potential tuition savings during the period of the student's co-op work experience.[1] Typically, tuition is collected from each student to cover the costs associated with the student's attendance at school. When a student in a co-op program is off-campus on a work experience, a reduced level of school resources is being consumed for this off-campus time. This is true whether the program is parallel or alternating. Nevertheless, in most cases, the school continues to collect tuition for those off-campus work experiences (over 70% of the schools in the sample stated that tuition was charged during this period of time). Thus, the proportion of funds for which there is not a corresponding consumption of resources (regardless of whether the program has additive or non-additive credit) must be counted as a financial benefit to the institution resulting from the impact of a cooperative education program.[1] To determine the relative magnitude of these savings, assuming that tuition is charged for the off-campus work experience, the amounts typically charged during work periods were tabulated by institutional characteristics and presented in Table 2.86.[2]

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[1] The discussion will mainly concern itself with tuition, even though the arguments hold equally well for Average Daily Attendance (ADA) funds received by institutions which report the co-op student as attending during the work experience. Unfortunately, these data were not acquired during the course of the study, so that the limitation of the discussion to tuition is understating the benefits accruing to an institution as a result of establishing a cooperative education program.

The mean tuition collected per student per year by each school charging tuition was $148.[3] In addition to the expected finding that tuition charges are higher in Private schools than in Public schools, it was found that IV-D schools, 4-year schools, New programs, and programs located in High unemployment States tended to experience greater tuition benefits during the period of student co-op work experience. The pattern of tuition by co-op enrollment is somewhat mixed, although it appears as if the per student tuition may drop somewhat as the program size grows. The impact of these patterns of financial savings on the overall net costs and benefits to an institution of conducting a cooperative education program is discussed in Subsection C.

C. Net Benefits to Institutions

This subsection will attempt to compare the costs and benefits of the co-op participation of an institution under a variety of assumptions. Before calculating the net benefits under a variety of revenue assumptions, however, consideration should be given to the understatement of costs to this point. It is clear that all of the annual incremental non-personnel costs associated with the co-op participation of an institution such as travel, supplies, plant and equipment, telephone. and postage, were not accounted. While the

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[1] Of course, to the extent there is a corresponding consumption of resources, such costs should have been measured previously so that the net benefit of these tuition savings will be determined only after combining the benefit and cost calculations - see below.

[2] The figures presented here are for a single work experience for each student, so that it was assumed that only one such experience was undertaken per student during a school year.

[3] A single school with an extreme value for tuition was dropped from the analysis. All schools reporting tuition reported tuition within a range of $15 to $740, except one which reported a tuition of over $2500. This outlier was dropped from the analysis.

TABLE 2.86: MEAN ANNUAL TUITION CHARGES PER STUDENT DURING CO-OP WORK EXPERIENCE BY INSTITUTIONAL CHARACTERISTICS[1]

CHARACTERISTICS	PER STUDENT TUITION	
	Number [3]	Mean
Total	55	148
IV-D Funding:		
Yes	28	171
No	27	125
Program Length:		
2-Year	28	107
4-Year	27	191
Ownership:		
Public	48	127
Private	7	298
Program Age:		
Old[2]	35	138
New	19	173
Unemployment:		
High	26	184
Low	29	116
Co-op Enrollment:		
Less than 80 students	17	207
80-219 students	20	93
220 or more	8	155

[1] Measured in 1975-76 dollars; limited to schools charging tuition during co-op work experience.

[2] An Old program is defined as one which admitted its first students prior to the 1974-75 academic year.

[3] Number of institutions for which means were calculated.

incremental costs associated with co-op involvement are likely to be negligible for some of these non-personnel costs (e.g., plant and equipment other than for the co-op administrative staff), the cumulative magnitude of these items should not be ignored.

By the same token, many of the relevant incremental personnel costs associated with co-op participation have not been measured. This includes, for example, the time spent by faculty in attending co-op orientation meetings, the necessity for more frequent course offerings, and the time spent in designing and scheduling special co-op courses.[1/] More importantly, however, are the traditional overhead and fringe benefit costs associated with the direct personnel cost which have not yet been included. It is reasonable to assume that, if positive incremental personnel costs due to co-op participation have been identified, then incremental overhead and fringe benefit costs should also be assigned to co-op participation.

Therefore, in order to properly account for all of the unmeasured incremental costs of co-op participation, a high, but still reasonable, overhead rate of 80 percent was applied to the operating cost figures of Table 2.84. The resulting operating cost figures are presented in column 1 of Table 2.87. Comparing these costs with several alternative benefit assumptions (see the remaining column of Table 2.87) should provide very realistic net benefit calculations; and, since the benefits resulting from Average Daily Attendance (ADA) financing could not be measured, many of the net benefit calculations provide *a fortiori* arguments for participation in cooperative education by an institution.

The first column on Table 2.87 clearly shows that, without some revenue generation activity on behalf of the co-op program, the net costs of operating such a program can be substantial. While the

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[1/] It is presumed that the time spent in such activities are actually realized in a higher paid staff than otherwise. If not, these tasks are being accomplished at a zero incremental cost from the point of view of the institution.

TABLE 2.87: MEAN ANNUAL INCREMENTAL NET BENEFITS OF CO-OP PARTICIPATION UNDER ALTERNATIVE REVENUE AND COST ASSUMPTIONS BY INSTITUTIONAL CHARACTERISTICS[1]

Characteristics	ALTERNATIVE COST AND REVENUE ASSUMPTIONS								
	No Revenue[3]	Tuition Only[4]	IV-D Only[5]	Non IV-D Only[6]	Fixed Benefit Only[7]	Tuition And IV-D Only[8]	Tuition And Non-IV-D Only[9]	Tuition And Fixed Benefits[10]	With Set-up Costs Amortized[11]
Total	-511	-363	-166	191	68	-18	339	216	207
IV-D Funding:									
Yes	-572	-401	-166	248	53	-56	419	224	215
No	-410	-285	--	-142	-192	-285	-17	-67	-77
Program Length:									
2-Year	-526	-419	-56	912	334	51	1019	441	435
4-Year	-499	-308	-262	-207	-158	-71	-16	33	20
Ownership:									
Public	-499	-372	-161	201	97	-34	338	224	214
Private	-571	-273	-196	145	-77	102	443	221	213
Program Age:									
Old[2]	-360	-222	-207	-179	-143	-69	-41	-5	-9
New	-742	-569	-108	1261	378	65	1434	551	534
Unemployment:									
High	-482	-298	-263	-233	-185	-79	-49	-1	-10
Low	-536	-420	-80	769	308	36	885	424	414
Co-op Enrollment:									
Less than 80 students	-860	-653	-108	1208	360	99	1415	567	546
80-129 students	-412	-319	-224	-183	-133	-131	-90	-40	-44
220 or more	-198	-43	-124	-154	-113	31	1	42	40

[1] Measured in 1975-76 dollars; all figures represent the addition and/or subtraction of means as presented in previous tables and do not correspond to the means of net figures computed for individual schools.

[2] An Old program is defined as one which admitted its first students prior to the 1974-75 academic year.

[3] The sum of the mean annual fixed and variable costs (does not include the one-time set-up costs for a co-op program) with an allowance for an 80 percent overhead rate included (1.8 x Table 2.84 figures) and a negative sign attached.

[4] The mean of the per student tuition paid during the co-op work experience on Table 2.86, plus (algebraically) the annual mean per student operating costs of Column 1.

[5] The mean annual IV-D funding of Table 2.85 expressed on a per student basis, plus (algebraically) the mean annual per student operating costs of Column 1.

[6] The mean annual Non-IV-D lump sum co-op funding of Table 2.85 expressed on a per student basis, plus (algebraically) the mean annual per student operating costs of Column 1.

[7] The mean of the sum of annual IV-D and other annual lump-sum funding of Table 2.85 expressed on a per student basis, plus (algebraically) the mean annual per student operating costs of Column 1.

[8] The mean annual per student tuition paid during the co-op work experience on Table 2.86, plus the mean annual IV-D funding of Table 2.85 expressed on a per student basis, plus (algebraically) the mean annual per student operating costs of Column 1.

[9] The mean annual per student tuition paid during the co-op work experience on Table 2.86, plus the mean annual Non-IV-D lump sum co-op funding of Table 2.85 expressed on a per student basis, plus (algebraically) the mean annual per student operating costs of Column 1.

[10] The mean annual per student tuition benefits of Table 2.86, plus the annual mean full lump-sum funding of Table 2.85 expressed on a per student basis, plus (algebraically) the mean annual per student

[11] The full annual per student benefit figures of the previous column, minus the set-up costs of Table 2.78 which are expressed on a per student basis (using the number of students of co-op programs in each school separately) and amortized on a 10-year basis (i.e., divided by 10).

figures vary by institution and program characteristic, the overall annual per student loss to the school is $511. Fortunately, the loss increases less than proportionally as the number of students increases but the loss is still substantial. Column 2 of Table 2.87 shows that reliance on tuition as the only revenue sources will, of course, reduce the net loss, but is not sufficient to run the program in the black. The total net loss under this assumption falls to $363. The financial position looks better for the larger programs on a per student basis because of the less than proportional increase in total operating costs, compared to the more or less proportional increase in total tuition benefits, but on a total loss basis they could be worse off.[1] Only for program sizes above 220 students is it likely that the total loss would be reduced and the per student loss eventually turned into a net gain. It is remarkable, however, how much the mean net loss for Private schools was reduced through the application of tuition revenues, so that much more positive statements may be made for Private facilities than for co-op programs in general. Their co-op programs are very likely to become economically viable using tuition as the only revenue source as they expand within the observed size range.

Turning to IV-D funding, it is clear that this funding source is insufficient to cover the operating costs of most co-op programs. The average loss with this funding was $166. It is interesting, however, that this funding source is concentrated in those areas where the costs are the highest: 2-year, New programs. In these areas, the funding is sufficient to cause the net loss to be less than in 4-year and Old programs. The same situation obtains with respect to Low unemployment areas, although the reason for the higher level of IV-D funding in this case is not altogether clear. Lastly, because of the fixed nature of this benefit, it is clear that it more nearly covers cost in small programs than in large programs in spite of the same relationship between operating cost and size. It should not be presumed from these figures, however, that IV-D funding can be relied upon for program support other than during the first few years of a program because of the temporary nature of such funding.

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[1] This can only be determined by an examination of marginal costs and benefits, and not average costs and benefits for cell interval data.

The figures shown for non-IV-D funding must be interpreted with caution because of the small number of schools receiving such funding.[1] For those schools receiving such funding, however, many found these sources to be adequate to make their programs economically viable with the average gain being $191. Just as with IV-D funding, the schools taking the most advantage of these non-IV-D sources are 2-year schools with New programs in low unemployment areas. These funds also are able to fully cover the operating costs of small programs because of their lump sum nature.

Combining the IV-D and non-IV-D funding sources produces the same patterns as the two component parts. For all facilities receiving one or both of these types of funding, a net benefit of $68 is produced. Again, in spite of higher operating costs, the 2-year program in Low unemployment states are the only ones to cover their operating costs with these sources alone. It also appears as if Public schools, but not Private schools, are able to fully cover costs with lump-sum grants. Finally, only the smallest programs can cover operating costs with the fixed grants; however, as the programs grow, the total operating costs increase whereas the benefits from these sources do not.

The addition of tuition to either of the lump-sum components produces the expected results. Tuition and IV-D funding combined results in a net loss of only $18 for the institutions receiving IV-D funding, whereas tuition and other lump-sum funding combined produces a net "profit" of $339 for those receiving non-IV-D funding.

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[1] The per student figures were calculated only for those schools receiving such funding.

In both cases, the IV-D schools with 2-year programs that are New and in Low unemployment states accrue the higher net benefits (or the least loss). The smallest programs fare the best on a per student basis but even the larger schools are able to cover or just meet their operating costs with either lump-sum funding plus tuition. Lastly, it is interesting that Private schools are placed in a preferred financial position because of the addition of the tuition revenues.

The net per student gain for co-op programs is $216 with all forms of revenues combined. The pattern is essentially the same as when considering the separate lump-sum/tuition combinations, except that both lump sum sources combined serve to cause an impact on Public schools which matches the impact of tuition on Private schools. The most striking feature of the total funding assumption figures is the small number of losses observed. The only true losses are for those schools not receiving IV-D funds (which, of course, violates the basic assumption for this column) and some programs in the middle size tertial. This is because the programs are large enough to spread out the fixed benefits but not large enough to yet take full advantage of the non-proportional increase in total incremental operating costs. The implications are clear, either stay small or expand beyond the middle tertial range (i.e., approximately 200 students).

The last column of Table 2.87 presents an attempt to adjust the full funding assumption column for the initial program set-up costs. By assuming a 10-year period of amortization and correcting the resulting set-up cost to a per student basis, the figures of the previous column could be adjusted by subtraction. The results are remarkable mainly for the lack of influence of the amortized set-up costs on the results previously described.[1] The per student adjustments range between $2 and $20 with the result that Old programs in High unemployment areas become marginal losses.

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[1] Part of this is a result of the set-up costs being computed for a single discipline area, whereas the other costs are computed for an "average" mix of multiple discipline areas. If 10 years elapse between the introduction of co-op programs in the individual discipline areas of a school's total program, then these figures are realistic.

In conclusion, therefore, it appears that the range of financing available for co-op programs is sufficient to at least cover the costs incurred as a result of the co-op programs. This conclusion is all the more important when it is recalled that other funding received by schools on behalf of co-op students during their co-op work experiences was not accounted. It is also clear that selected types of programs do not need to access the full range of sources to fully cover their operating costs. These conclusions, of course, assume that these sources continue to be available to each school in the assumed mixes of Table 2.87 and this is not altogether certain. For example, IV-D funding is critical to many program types, but cannot be relied upon as a perpetual funding source. The same may be said of the other lump-sum funding sources. Only tuition can be relied upon, and it is by itself not sufficient. There is some relief if the program is large enough to take advantage of the less than proportional increase in operating costs, but few programs are of the necessary size. Finally, it should be recalled that these figures do not control for program discipline areas so that the applicability of the reported figures to any given school (and its particular mix of discipline areas) is unknown.

IV. ANALYSIS OF CO-OP STUDENT EMPLOYER COSTS AND BENEFITS

Introduction

The purpose of this section is to measure the costs and benefits incurred by employers who participate in the cooperative education system. The employers' view of the costs relative to the benefits of co-op participation will, to a large degree, determine whether they decide to continue or discontinue their participation in co-op. If employers view co-op students as a sound economic source of manpower, participation will continue. If not, continued participation is in doubt and expansion is out of the question. Therefore, any evaluation of the present or future status of the cooperative education system must entail a careful examination of how the various co-op employers view the costs and benefits incurred from participation in co-op.

In order to accomplish this goal, primary data collected from co-op and non-co-op employers on the incurred costs and benefits are analyzed in this section. While the sample of co-op and non-co-op employers drawn was not representative of all employers in each group, the sample was sufficiently large (approximately 250 co-op employers and 125 non-co-op employers) and the questionnaire was sufficiently detailed to provide a thorough examination of the costs and benefits attributable to employing co-op students. Information was collected on the costs incurred by co-op employers in relation to the training, supervision, evaluation, etc. of co-op student employees and how these costs compare to those for regular employees. Likewise, information was gathered on the benefits (e.g., reduced recruitment costs, higher productivity, etc.) derived by employers from hiring co-op students. Information on net gains was also derived from co-op employers through questions regarding their plans for future participation in co-op. Analysis of variance and Chi Square analysis were used in determining the statistical significance of relationships noted in the responses of employers to these cost- and benefit-related questions.

A. Employer Sample Characteristics

The samples of co-op and non-co-op employers used in the primary data collection were not drawn to be representative of all employers in each group. Instead, employers were selected on the basis of their association with sample schools. In the case of co-op employers, the two firms employing the most co-op students from each sample school--within a 20-mile radius--were chosen. One non-co-op employer was also selected within a 20-mile radius of each sample school, which was similar to one of the selected co-op employers, and which had been approached for participation in the co-op program but declined.

The non-representativeness of the co-op and non-co-op employer samples suggests that the characteristics of the employer sample be examined prior to analyzing the cost and benefit information collected. Because the analysis in this section focuses primarily on data collected on the costs and benefits incurred by firms participating in co-op, the description of the employer sample is restricted to such employers. Table 2.88 provides information on the characteristics of the co-op employer sample.

The general characteristics of co-op employers shown in Table 2.88 include size and type of firm as well as whether the firm's employees are unionized or not. As the table indicates, over half the firms had 150 or fewer full-time employees, and 70 percent had less than 500 employees. In terms of the type of industries in the co-op employer sample, it appears that they are concentrated largely (over two-thirds) in the nondurable goods and private service industries. Included in the private service sector are industries involved in Wholesale and Retail Trade, Finance, Insurance, and Real Estate. Less than 30 percent of the co-op employers utilize unionized employees.

Also described in Table 2.88 are characteristics of co-op firms relating to their employment of co-op students. Nearly 30 percent of the co-op firms employ only one co-op student, and almost 60 percent employ four or less co-op students. The median number of co-op students employed by each firm was found to be slightly less than three students. The data in Table 2.88 also indicate that the majority (53%) of co-op firms have participated in co-op for five or more years. The jobs given co-op students by firms in the employer sample tend to be in white-collar occupations (76%). More specifically, nearly two-fifths of the jobs filled by co-op students are in the professional and technical area. Over one-fifth of the co-op students are with their employer for one year or less. And finally, almost all of the co-op firms sampled (96%) do not require co-op student employees to join a union.

TABLE 2.88: DISTRIBUTIONS OF FIRMS IN CO-OP EMPLOYER SAMPLE BY SELECTED CHARACTERISTICS

CHARACTERISTICS OF CO-OP EMPLOYERS	NUMBER OF CO-OP EMPLOYERS[1]		PERCENT OF ALL CO-OP EMPLOYERS	
General Characteristics				
Size of Firms:				
1-30 Full-time employees	69		31	
31-150 Full-time employees	52		23	
151-499 Full-time employees	35		16	
500 or more Full-time employees	68		30	
Type of Industry:				
Durable goods	55		24	
Nondurable goods and Private service sector	158		67	
Public service sector	21		9	
Industrial Relations Structure:				
Unionized	69		29	
Non-unionized	165		71	
Co-op Related Characteristics				
Number of Co-op Students Employeed:				
1 co-op student	66		29	
2-4 co-op students	67		30	
5-10 co-op students	43		19	
10 or more co-op students	50		22	
Length of Time Firms Have Employed Students:				
3 years or less	26		28	
4-5 years	17		19	
6-10 years	25		26	
11 years or more	24		27	
Type of Jobs Held by Co-op Students:				
White collar	165		76	
Professional and technical		84		39
Managers and administrators		20		9
Sales workers		11		5
Clerical workers		50		23
Blue collar	26		12	
Service workers	27		12	
Average Length of Time Student Remains with Firm:				
1-6 months	90		40	
7-12 months	86		38	
13 or more months	49		22	
Union Membership of Co-op Student:				
Required	9		4	
Not required	201		96	

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[1] The total number of employers sampled is not the same for each characteristic, due to the variance in non-response or incorrect responses to different questions.

Table 2.89 provides information regarding the institutions from which co-op employers select students. Slightly more than half (56%) of the sample employers selected co-op students from 2-year schools, while the balance selected students from 4-year schools. About three-fourths of the schools from which mployers drew co-op students received IV-D funding. Fifty-six percent of the employers selected co-op students from schools where the unemployment rate for that State was high (above the median for all 50 states).

TABLE 2.89 : DISTRIBUTION OF FIRMS BY CHARACTERISTICS OF INSTITUTIONS FROM WHICH EMPLOYERS DRAW CO-OP STUDENTS

CHARACTERISTICS OF INSTITUTIONS	NUMBER OF EMPLOYERS	PERCENT OF ALL EMPLOYERS
Type of School		
2-year	131	56
4-year	103	44
Funding of School		
IV-D Funded	177	76
Non-IV-D Funded	57	24
Unemployment Rate in State of School		
High unemployment rate	130	56
Low unemployment rate	104	44

In summary, the sample of co-op employers used in the primary data collection effort appears to be sufficiently diversified to enable analysis of costs and benefits for a variety of employer types. Although the sample drawn does not permit analysis by detailed industrial or occupational category, it is adequate for an analysis of costs and benefits by major industrial and occupational breakdowns. Furthermore, the sample included an adequate representation of union and non-union firms, firms hiring from IV-D funded and non-IV-D funded schools to permit analysis of costs and benefits by these characteristics, as well as several others. Although it is not possible to assess how representative this sample is of all co-op employers (since no known source of descriptive data on the universe of firms employing co-op students exists), it is apparent that this sample enables one to analyze many characteristics of co-op firms which are likely to impact on the costs and benefits of employing co-op students.

B. Co-op Student Employer Costs

Firms incur costs of several different types by employing co-op students. Start-up costs, for example, are incurred by the co-op employer to the extent that initial participation in the co-op program requires negotiations with one or more schools. Other personnel costs incurred by employers, such as wages, interviewing, training, etc. are not unique to co-op student employees but may be differentiable. Therefore, when costs are common to both co-op student employees and regular employees, the relative costs are compared.

For purposes of this study, the personnel costs to firms are divided into two major categories: direct and indirect costs. Direct costs include those related to initiation of the co-op programs (start-up activities) training, wages, evaluation, and supervision. The indirect costs examined are turnover among employees, union negotiations, and customer relations. Each of these costs is examined for co-op student employers as a whole, and by various characteristics associated with the employers such as firm size, number of schools from which the firm draws co-op students, and length of time the firm has been employing co-op students.

1. Direct Costs of Co-op Student Employers

The most obvious cost to the firm of maintaining personnel is salaries or wages paid to the worker. However, there are many other costs incurred by the employer as a direct result of employing additional personnel. While these costs, such as training, supervision, and evaluation, cannot be easily measured in terms of dollar amounts, reasonable estimates are obtainable of the time allotted these tasks. Data on these costs were obtained from firms with both co-op and non-co-op employees. In the subsections that follow, individual costs attributable to employing co-op students are measured. If the cost category is not unique to the employment of co-op students, the cost estimates are then compared to the same costs for regular employees.

a. Start-up Costs

The start-up costs to a firm of participation in a co-op program are those associated with conducting initial negotiations with schools. During such negotiations, corporate management works out the terms of the agreement with each school's co-op program officials. This cost item is unusual in that, in contrast to most other co-op-related costs, it is uniquely associated with co-op participation and it is a once-and-for-all outlay at the initiation of a program with a school.

In order to measure this cost, data were collected on the number of staff hours devoted to initial negotiations with schools. Based on these estimates, it was determined that the mean number of hours spent by employers in negotiations with a school was just over five hours per school. Mean hours of negotiation per school were also computed according to the size of the firm, the presence of IV-D funding, the job categories in which co-op students were placed, the level of unemployment in the state, and by the number of co-op schools with which the firm participates. However, no statistical differences, as measured by F-ratios, were noted in the mean hours spent in negotiation broken down by these characteristics.

One additional breakdown of the mean hours spent by co-op employers in negotiations with schools that did yield statistically different means (as measured by a t-statistic at the 95%

level of significance) was that by length of program. The results obtained suggest that co-op employers spend less time negotiating with 2-year schools (4.2 hours) than with 4-year schools (6.8 hours). This may be a result of a narrower range of work assignments for which the 2-year co-op program student is eligible compared to that for a 4-year co-op student.

The lack of a significant difference is a particularly surprising finding in the case of mean hours of negotiation broken down by the number of schools with which the firm participates (negotiates). It implies that no discernable cost savings accrues to a firm that has experience in negotiating with co-op schools. Therefore, as firms deal with an increasing number of schools, the incremental (marginal) start-up costs do not diminish. As Table 2.90 indicates, larger firms tend to draw co-op students from more schools, and, therefore, incur proportionally larger start-up costs.

TABLE 2.90: DISTRIBUTION OF FIRMS ACCORDING TO THE NUMBER OF SCHOOLS FROM WHICH FIRM DRAWS CO-OP STUDENTS BY FIRM SIZE[1]

NUMBER OF SCHOOLS FROM WHICH FIRM DRAWS CO-OP STUDENTS	NUMBER OF EMPLOYEES (FIRM SIZE)							
	1-30		31-150		151-499		500 or more	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1	58	84.1	36	69.2	18	51.4	19	27.9
2-4	9	13.0	11	21.2	12	34.3	20	29.4
5-9	2	2.9	5	9.6	4	11.4	17	25.0
10	0	0	0	0	1	2.9	12	17.6

[1] Percentages are for columns.

b. Compensation Costs

Compensation costs, such as wages, vacation and sick leave, and other fringe benefits incurred by employers of co-op students are examined in this section. Data were collected on whether employers compensate co-op students more, less, or the same, in terms of these three items, as regular employees. Table 2.91 indicates that a much larger proportion of employers pay co-op students lower wages, compared to regular employees, than pay them higher wages. This phenomenon holds true for vacation and sick leave and other fringe benefits as well as for wages. A Chi Square test was used to test the statistical significance of these differences and they were all found to be significant at the 95 percent confidence level.[1/] Thus, it would appear that employers

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[1/] The Chi Square test was used to determine whether the number of employers reporting more (less) costs was significantly greater at the 95 percent confidence level than those reporting less (more) costs. The determination of the theoretical distribution, for purposes of the Chi Square test, was complicated by the fact that employers could respond that there was no difference in the costs incurred. One approach is to exclude the group reporting no difference and perform a Chi Square test on the remaining 2 groups (Example 1).

EXAMPLE 1:

	Expected	Observed
More	8	1
No difference	X	X
Less	8	15

$$x^2 = \sum \frac{(\text{observed} - \text{expected})^2}{\text{expected}}$$

$$x^2 = \frac{(1-8)^2}{8} + \frac{(15-8)^2}{8}$$

$$x^2 = \frac{49}{8} + \frac{49}{8} \therefore x^2 = 12.25^*,$$

which indicates significance at the 95 percent confidence level. Another approach is to apportion the difference in responses equally between the more and less costs groups (Example 2).

EXAMPLE 2:

	Expected	Observed
More	8	1
No difference	100 100	100 100
Less	8	15

$$x^2 = \frac{(101-108)^2}{108} + \frac{(115-108)^2}{108}$$

$$x^2 = \frac{49}{108} + \frac{49}{108} \therefore x^2 = .907,$$

which indicates no significance at the 95 percent confidence level.

Using the first approach (Example 1), one has increased the probability of getting a significant difference because only the tails of the distribution are examined. Therefore, the Chi Square test shown in Example 2 is used throughout the section to test for the significance of the differences noted in this type of distribution.

incur less cost, in terms of direct compensation to the employees, when a co-op student performs a given task as opposed to a regular employee (assuming equal levels of productivity).

TABLE 2.91: DISTRIBUTION OF FIRMS ACCORDING TO CO-OP STUDENT COMPENSATION RELATIVE TO REGULAR EMPLOYEES BY TYPE OF COMPENSATION[1/]

CO-OP STUDENT COMPENSATION RELATIVE TO REGULAR EMPLOYEES	TYPE OF COMPENSATION					
	WAGES OR SALARY		VACATION TIME, HOLIDAYS, AND SICK LEAVE		OTHER FRINGE BENEFITS	
	Number	Percent	Number	Percent	Number	Percent
More	17	7.9	3	1.4	3	1.4
Less	102	47.2	111	51.6	113	52.8
No Difference	97	44.9	101	47.0	98	45.8

[1/] Percentages are for columns.

It should be noted, however, that the difference between the vacation and sick leave and other fringe benefits of co-op students compared to regular employees may simply reflect the fact that over three-fourths of the co-op students are with a firm for one year or less (see Table 2.88 in Section IV.A). These types of compensation, of course, are especially dependent on the length of time an employee is with a firm. For this reason, and the fact that wages comprise the major portion of total compensation paid to employees, the Chi Square analysis will focus largely on wages as opposed to the other forms of compensation.

Co-op students' wages relative to those of regular employees were then cross-tabulated according to the size of the firm, the job categories of the employees, the presence of IV-D funding, the level of unemployment, the length of the program, and by whether the co-op student employees were required to join a union. A Chi Square test was used to determine the statistical significance of variations in the pattern of response for all firms compared to that of firms categorized by these variables.

Chi Square tests of the response frequencies of each cross-tabulation indicated that the response patterns by size of firm, union membership, and length of program were significantly different from that for all co-op employers at the 95 percent confidence level, while those by other characteristics were not. Table 2.92 provides the results of the cross-tabulation of co-op students' wages relative to regular employees by firm size. It appears that small firms tend to save on wage costs more often than larger firms when using co-op students to perform tasks rather than regular employees. Column 1 indicates that the majority (61.3 percent) of the firms with 30 employees or less pay co-op students less than regular employees, while only 46.9 percent of the largest firms (column 4) pay co-op employees less than regular employees. One possible hypothesis that would explain the fact that smaller firms pay co-op students less relative to regular employees is that greater wage flexibility exists in the wage structure of smaller firms, and thus they can pay lower wages to less experienced personnel.

TABLE 2.92: DISTRIBUTION OF FIRMS ACCORDING TO CO-OP STUDENT WAGES RELATIVE TO REGULAR EMPLOYEES BY FIRM SIZE[1]

CO-OP STUDENT WAGES COMPARED TO REGULAR EMPLOYEES	NUMBER OF EMPLOYEES (FIRM SIZE)							
	1-30		31-150		151-499		500 or more	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
More	3	4.8	5	10.6	5	14.7	4	6.3
Less	38	61.3	19	40.4	9	26.5	30	46.9
No Difference	21	33.9	23	48.9	20	58.8	30	46.9

[1] Percentages are for columns.

Wages of co-op employees relative to those of regular employees were examined, based on whether the co-op employee was required to join a union or not. As seen in Table 2.88 of Section IV.A, only 4 percent of employers required co-op students to join a union, but in all nine instances where co-op students were required to join a union, there was no difference observed between the wages received by co-op students and regular employees. On the other hand, almost half of the co-op students working for employers not requiring union membership were paid less than regular employees (see Table 2.93).

TABLE 2.93: DISTRIBUTION OF FIRMS ACCORDING TO CO-OP STUDENT WAGES RELATIVE TO REGULAR EMPLOYEES BY UNION MEMBERSHIP REQUIREMENT[1]

CO-OP STUDENT WAGES RELATIVE TO REGULAR EMPLOYEES	CO-OP EMPLOYEES REQUIRED TO JOIN A UNION		CO-OP EMPLOYEES NOT REQUIRED TO JOIN A UNION	
	Number	Percent	Number	Percent
More	0	0	14	7.6
Less	0	0	90	48.6
No Difference	9	100.0	81	43.8

[1] Percentages are for columns.

Finally, significantly different distributions of firms were indicated when segregated by the length of the program being considered. Table 2.94 shows that a significantly high proportion of the employers pay lower wages to co-op students from 4-year program than is observed for students from 2-year programs. Such differences were not observed by student job category (the most likely explanation for these findings), but another explanation presented below) is that the lower salaries are a reflection of more intensive, informal on-the-job training.

TABLE 2.94: DISTRIBUTION OF FIRMS ACCORDING TO CO-OP STUDENT WAGES RELATIVE TO REGULAR EMPLOYEES BY LENGTH OF PROGRAM[1/]

CO-OP STUDENT WAGES RELATIVE TO REGULAR EMPLOYEES	LENGTH OF PROGRAM			
	2-YEAR		4-YEAR	
	Number	Percent	Number	Percent
More	12	9.8	5	5.3
Less	42	34.4	60	63.8
No Difference	68	55.7	29	30.9

[1/] Percentages are for columns.

c. Training Costs

Training costs for co-op students and regular employees were measured through questions on the number of hours devoted to the training of each type of employee. This training included orientation classes, training sessions, and the use of training aids and equipment. On the average, 89.9 hours were spent training co-op student employees, compared to 90.6 hours for the training of regular employees. These means were not found to be significantly different from one another as measured by a t-statistic at the 95 percent level of confidence.

For comparative purposes, the training time utilized for co-op students was expressed as a ratio of that for regular employees. This relative-training ratio was then examined for variation by job category of the employees, discipline area of the students, length of time the student was with the firm, the length of the co-op program, the unemployment level in the state, the presence of IV-D funding, and the size of the firm. F-ratios were used to measure the statistical significance of differences noted in the mean training ratios for each breakdown, but none of these breakdowns yielded significantly different means. This means that co-op students cost no more to train via formal training programs than regular employees.

d. Supervision Costs

The supervision costs incurred by the employers of co-op and non-co-op employees were measured in terms of the number of hours per week which typically were devoted to supervising each type of employee. The average number of hours of supervision per week devoted to a co-op student was 11.4, as compared to 10.7 hours for a regular employee. These means were not found to be significantly different from one another as measured by a t-statistic at the 95 percent level of significance. Again, the number of hours spent on co-op students was expressed as a ratio of the number of hours utilized for regular employees. This relative-supervision ratio was also examined for variation by job category of the employees, discipline area, length of time student was with the firm, the length of the co-op program, the unemployment level in the state, the presence of IV-D funding, and the size of the firm. Only the breakdown by the length of program yielded mean hours that were significantly different from one another--as measured by F-ratios. Those employers hiring co-op students from 4-year programs devoted substantially more hours per week to supervision than did those hiring co-op students from 2-year programs. This increased supervision time is likely a reflection of more intensive informal on-the-job training required, and certainly inconsistent with the more frequently observed negative wage differential for employers of those students.

e. Evaluation Costs

Several questions regarding the evaluation of co-op students were asked of co-op student employers. None of the responses, however, permitted the calculation of the average amount of time allocated to this task. Information was, however, obtained on the amount of time spent per evaluation of a co-op student as compared to a regular employee. These results are presented in Table 2.95. While the majority of co-op employers responded that co-op students require about the same amount of evaluation time as non-co-op students, three times as many employers reported more time was spent with co-op students than reported less time. Furthermore, a Chi Square test showed that the distribution observed was significantly different from a random distribution at the 95 percent confidence level. This suggests that more evaluation time is required for the average co-op student than for the regular employee. (That is, evaluation costs are somewhat higher for the co-op student than the regular employee.) This is probably a direct consequence of the co-op employer's participation in the school's evaluation and/or grading of co-op students. Thus, this cost is more related to the nature of the program than it is to the nature of the employees. It is a cost of participation, however.

TABLE 2.95: DISTRIBUTION OF FIRMS ACCORDING TO EVALUATION TIME FOR CO-OP STUDENTS COMPARED TO REGULAR EMPLOYEES[1]

CO-OP STUDENT EVALUATION TIME COMPARED TO REGULAR EMPLOYEES	NUMBER OF EMPLOYERS	PERCENT OF ALL EMPLOYERS
More	66	36.1
Less	22	12.0
No Difference	95	51.9

[1] Percentages are for columns.

The evaluation time spent on co-op students compared to regular employees was cross-tabulated by job category of the student, discipline area, length of time student was with the firm, by size and type of firm, the length of the co-op program, the presence of IV-D funding, the level of unemployment in the state, and by whether evaluation results were sent to the school. Three cross-tabulations yielded statistically significant results as measured by a Chi Square test at the 95 percent confidence level: (1) the length of time with the firm, (2) the length of the co-op program, and (3) the presence of IV-D funding. As Table 2.96 indicates, the longer a co-op student remains with a firm, the smaller the differential in evaluation time between himself and a regular employee. At the same time, this table indicates that evaluation time for co-op students is more than for regular employees if the firm hires the students from schools without IV-D funding or from 2-year program schools.

TABLE 2.96: DISTRIBUTION OF FIRMS ACCORDING TO EVALUATION TIME FOR CO-OP STUDENTS COMPARED TO REGULAR EMPLOYERS BY SELECTED CHARACTERISTICS[1]

	CO-OP STUDENT EVALUATION TIME RELATIVE TO REGULAR EMPLOYEE					
	MORE		LESS		NO DIFFERENCE	
CHARACTERISTICS	Number	Percent	Number	Percent	Number	Percent
Months with Firm:						
1-6	26	34.7	10	13.3	39	52.0
7-12	33	49.3	7	10.4	27	40.3
≥13	6	16.2	5	13.5	26	70.3
Length of Program:						
2-Year	38	40.0	6	6.3	51	53.7
4-Year	28	31.8	16	18.2	44	50.0
IV-D Funding: Yes	40	30.5	20	15.3	71	54.2
No	26	50.0	2	3.8	24	46.2

[1] Percentages are for rows.

2. Indirect Costs to Co-op Student Employers

In addition to the costs incurred which are directly related to the number of co-op students employed, firms may incur costs indirectly from their participation in co-op. For example, union negotiations may be more complicated or protracted when co-op students have become employees; the rapid turnover of co-op students may have a disruptive effect on regular employees, causing some loss of productivity; or customer relations may potentially suffer if co-op students, less mature or experienced than regular employees, handle problems with customers poorly. Each of these types of potential indirect costs is examined in the three following subsections.

a. Turnover Costs

In order to compare turnover costs associated with co-op students to those related to regular employees, employers of co-op students were asked if their turnover costs associated with co-op students were more, less, or the same as those related to regular employees. The frequency of the responses is reported in Table 2.97. Although more employers reported less turnover

TABLE 2.97: DISTRIBUTION OF FIRMS ACCORDING TO CO-OP STUDENT TURNOVER COSTS COMPARED TO REGULAR EMPLOYEES[1]

CO-OP STUDENT TURNOVER COSTS COMPARED TO REGULAR EMPLOYEES	NUMBER OF EMPLOYERS	PERCENT OF ALL EMPLOYERS
More	46	21.7
Less	78	36.8
No Difference	88	41.5

[1] Percentages are for columns.

costs attributable to co-op employees than reported more, the distribution obtained is not significantly different (at a 95 percent level of confidence) from the distribution expected if the costs were the same for co-op and non-co-op employees (as measured by a Chi Square test). Thus, it would appear that despite the short-term nature of co-op students' employment with a firm, very little disruption of normal activities occurs when these employees depart and no significant additional expense is involved.

This information on turnover costs was cross-tabulated by length of time the student was employed with the firm, the length of the co-op program, the presence of IV-D funding, by job category of the student, the level of unemployment in the state, discipline area, whether union membership was required, and by size and type of firm. However, none of these cross-tabulations yieled statistically significant differences in the patterns of responses from that for all co-op employers as measured by Chi Square tests at the 95 percent confidence level. This is a very significant finding as it debunks one of the often heard employer objectives to participating in the co-op program. Of course, it might also be that co-op students are used to fill high turnover positions which few regular employees find attractive and in which few regular employees remain.

b. Union Negotiation Costs

Information on union negotiation costs was obtained from co-op employers through a question concering whether union negotiation costs were more, less, or no different for co-op students compared to regular employees. The responses to this question by co-op employers who had unionized employees are displayed in Table 2.98. As the table indicates, nearly 70 percent of the employers reported no difference in union negotiations for co-op versus non-co-op employees. Although the majority of employers reporting cost differences responded that co-op students cost less, the proportion of co-op employers reporting cost differences was not sufficient to attach statistical significance to these responses (as measured by a Chi Square test at the 95 percent confidence level).

The responses of co-op employers to the question regarding negotiation costs were cross-tabulated by job category of the student, the presence of IV-D funding, the level of unemployment in the state, the length of the co-op program, discipline area, whether union membership was required, and by size and type of firm. However, none of these cross-tabulations yielded statistically significant differences (as measured by Chi Square tests at the 95 percent confidence level) in the patterns of responses from that for all co-op employers. Since so few firms had mandatory union membership for co-op students, it is surprising that the number of employers reporting "Less" union negotiation costs was not higher. In any case, it is clear that such costs for a co-op student are not higher than for regular employees.

TABLE 2.98: DISTRIBUTION OF FIRMS ACCORDING TO UNION NEGOTIATION COSTS FOR CO-OP STUDENTS COMPARED TO REGULAR EMPLOYEES[1/]

CO-OP STUDENT UNION NEGOTIATION COSTS COMPARED TO REGULAR EMPLOYEES	NUMBER OF EMPLOYEES	PERCENT OF ALL EMPLOYERS
More	1	1.7
Less	17	28.8
No Difference	41	69.5

[1/] Percentages are for columns.

c. Customer Relations

One might hypothesize that the comparative inexperience of a co-op employee relative to a regular employee would cause co-op students to handle problems with customers less cleverly and hence, hinder customer relations. In order to examine how employers perceived customer relations costs attributable to co-op students versus regular employees, they were asked to described their costs for co-op students compared to regular employees in terms of it being more, less, or the same. Table 2.99 provides the frequencies of the co-op employers' responses to this question. As the table indicates, over three-fourths of the employers responded that co-op and non-co-op employees have the same effect on customer relations costs. Interestingly, of those employers who did view the costs differently for co-op and non-co-op employees, more than four times as many reported that co-op students cost less than reported that they cost more. However, because the proportion of co-op employers reporting cost differences was so small (23%), no statistical significance (as measured by a Chi Square test at the 95 percent confidence level) can be attached to these differences.

TABLE 2.99: DISTRIBUTION OF FIRMS ACCORDING TO CUSTOMER RELATIONS COSTS FOR CO-OP STUDENTS COMPARED TO REGULAR EMPLOYEES[1]

CUSTOMER RELATIONS COSTS FOR CO-OP STUDENTS COMPARED TO REGULAR EMPLOYEES	NUMBER OF EMPLOYERS	PERCENT OF ALL EMPLOYERS
More	9	4.4
Less	39	18.9
No Difference	158	76.7

[1] Percentages are for columns.

The responses by employers to the question on customer relations costs were cross-tabulated by job category of the student, the presence of IV-D funding, the level of unemployment in the state, the length of the co-op program, discipline area, whether union membership was required, and by size and type of firm. The only cross-tabulation that yielded response patterns significantly different from the pattern for all co-op firms, as measured by the Chi Square test at the 95 percent confidence level, was that by job category of the student. The information in this cross-tabulation, shown in Table 2.100, indicates that the tendency of co-op students to cost the same or less than regular employees in terms of customer relations is greatest in professional and technical occupations and least in service occupations. Of course, given the level of work to which co-op students are often assigned, customer relations are probably most important for the service worker. Even within this job category, however, co-op students did as well as regular employees.

TABLE 2.100: DISTRIBUTION OF FIRMS ACCORDING TO CUSTOMER RELATIONS COSTS FOR CO-OP STUDENTS COMPARED TO REGULAR EMPLOYEES BY JOB CATEGORY[1/]

CUSTOMER RELATIONS COSTS FOR CO-OP STUDENTS COMPARED TO REGULAR EMPLOYEES	JOB CATEGORY							
	PROFESSIONAL AND TECHNICAL WORKERS		OTHER WHITE COLLAR WORKERS		BLUE COLLAR WORKERS		SERVICE WORKERS	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
More	1	1.4	4	5.3	0	0	4	17.4
Less	10	13.5	14	18.7	7	30.4	5	21.7
No Difference	63	85.1	57	76.0	16	69.6	14	60.9

[1/] Percentages are for columns.

3. Summary

In summary, eight different types of costs (both direct and indirect) incurred by co-op employers were examined in this section. Comparisons were made between those for co-op students and those for regular employees, except, of course, in the case of program start-up costs, which are not associated with regular employees. The one area where co-op students costs were greater than regular employees was evaluation costs. On the other hand, all forms of compensation costs--wages, vacation time and sick leave, and other fringe benefits--were less for co-op student employees than for regular employees. Other cost categories (formal training, supervision turnover, union turnover, union negotiation, and customer relations) did not yield statistically significant overall differences between those for co-op and regular employees. Unfortunately, it is not possible to associate a monetary value to all of these costs and obtain a figure giving the net cost savings of hiring co-op students. However, one can safely say that as measured by these cost factors; it is clear that it is not costly for employers to hire co-op students: rather it may be less costly to hire co-op students. In those instances where the individual cost items were greater for co-op students than for regular employees, it did not appear to be by a substantial margin and the cost itself was not a major cost to the employer in terms of his total costs.

While many of the cross-tabulations of these cost factors by characteristics of the firms employing co-op students did not yield statistically significant results, two important conclusions can be drawn from the cross-tabulations that were significant. First, from a cost standpoint, it initially appears that it is no more advantageous for large firms to participate in co-op than for small firms. Because larger firms deal with more schools, and because marginal start-up costs per school do not diminish, larger firms incur proportionately greater start-up costs. It is probable, however, that on a per student basis, rather than a per school basis, the start-up costs are smaller for a large firm than a small firm. In addition, the lowering of recruiting cost may be more significant for a large firm able to deal with more schools and a larger pool of co-op students. More importantly, however, the wage cost savings from employing co-op students are less for larger firms than for smaller firms (see Table 2.92 in Section IV.B.1.b). A second finding is that the additional evaluation costs incurred by employers of co-op students diminish rapidly as the length of job tenure of the co-op student rises (see Table 2.96 in Section IV.B.1.e). Thus, the longer a firm employs a co-op student, the less likely it is that the evaluation costs will exceed, to a significant extent, those for regular employees.

On balance though, these results place the co-op student in a very good position in relation to regular employees. Even considering the findings above, the analysis of the cost factors indicates that co-op employees are competitive enough to make their use economically viable. The next section includes an examination of the benefits incurred by employers of co-op students. The specific areas studied include: 1) worker productivity; 2) recruitment and hiring; and 3) community relations. The comparison of the benefit information obtained with that for costs will permit an assessment of how co-op employers view participation in co-op programs from an economic perspective.

C. Co-op Student Employer Benefits

The benefits accruing to firms that employ co-op students are examined in this section. As in the case of costs, responses to the co-op employer questionnaire are used as the data base for this analysis. The measurement of benefits to co-op employers, however, is somewhat more subjective than the measurement of their costs. For example, an employer can more accurately respond to a question regarding whether a co-op student is paid more than a regular employee than to a question regarding morale or productivity differences attributable to a co-op employee. Nevertheless, several areas can be cited in which co-op participation may potentially benefit employers. These areas include the following:

- Worker productivity;
- Recruitment and hiring; and
- Community relations.

Co-op employer benefits in each of these areas are examined for different groups of firms in the subsequent sections of this report (Sections IV.C.1 - IV.C.3).

1. Productivity Benefits to Co-op Student Employers

One broad area in which employers may reap benefits from participating in co-op programs is in terms of employee performance--essentially through increased productivity in the short-run, or over the long-run. This may come about through the superior performance of co-op employees themselves or through the improved performance of regular employees derived from the stimulus provided by co-op students. Therefore, the first part of this section focuses on how the co-op student's performance on the job compares to that of a regular employee and the second part concerns how the co-op student's work impacts on regular employees.

a. Co-op Students' Performance

In this subsection, the co-op student's performance on the job is compared to that of a regular employee. As one measure of performance, employers of co-op students were asked to evaluate how co-op employees compared to regular employees according to the following eight skill measures:

- Technical knowledge;
- Communication skills;
- Quality of work;
- Quantity of work;
- Cooperation, ability to work with people;
- Dependability;
- Ability to follow instructions;and
- Motivation.

The responses of the co-op employers are presented in Table 2.101. For all eight of the skill categories, the overwhelming majority of the employers reported that co-op students perform as well or better than regular employees. Furthermore, Chi Square tests showed that for every category--with the exception of quantity of work--the differences noted are significant at the 95 percent confidence level. It should be noted that the skill categories form two very distinct groupings with respect to the percentage of co-op employers reporting co-op students worse. Table 2.101 shows that the first four skill categories form one group and the last four the other. The interesting point is that the first group can be considered firm or industry specific skill which can be improved by on-the-job experience, whereas the second group represents general skills and attributes. In the second group of skills, co-op students are considered worse than regular employees less than half as often as in the first group of skills.

One might hypothesize that the productivity of co-op students relative to regular employees varies by job category. In order to test this hypothesis, the eight skill categories shown in Table 2.101 were cross-tabulated by job category. The significance of the differences noted in the resultant cross-tabulations was tested via Chi Square analysis. In two of the areas, quality of work, the variations in the distribution of responses by job category were significant at the 95 percent confidence level.

TABLE 2.101: PERCENT OF FIRMS ACCORDING TO CO-OP STUDENT PERFORMANCES COMPARED TO REGULAR EMPLOYEES[1]

SKILL CATEGORY	PERCENTAGE OF CO-OP EMPLOYERS REPORTING CO-OP STUDENTS BETTER	PERCENTAGE OF CO-OP EMPLOYERS REPORTING CO-OP STUDENTS THE SAME	PERCENTAGE OF CO-OP EMPLOYERS REPORTING CO-OP STUDENTS WORSE
Technical knowledge	46.5	26.3	27.2
Communication skills	47.0	38.4	14.6
Quality of work	44.7	37.9	17.4
Quantity of work	36.2	42.2	21.6
Cooperation, ability to work with other people	51.6	45.7	2.7
Dependability	44.8	49.8	5.4
Ability to follow instructions	49.8	44.3	5.9
Motivation	67.3	28.6	4.1

[1] Percentages are for rows.

Tables 2.102 and 2.103 provide the results of the cross-tabulation of job category of the students and question

TABLE 2.102: DISTRIBUTION OF FIRMS ACCORDING TO THE QUALITY OF WORK PERFORMED BY CO-OP STUDENTS COMPARED TO REGULAR EMPLOYEES BY JOB CATEGORY[1]

QUALITY OF WORK PERFORMED BY CO-OP STUDENTS COMPARED TO REGULAR EMPLOYEES	JOB CATEGORY							
	PROFESSIONAL AND TECHNICAL WORKERS		OTHER WHITE COLLAR WORKERS		BLUE COLLAR WORKERS		SERVICE WORKERS	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Better	26	32.9	39	50.6	18	75.0	10	40.0
No Difference	32	40.5	31	40.3	4	16.7	11	44.0
Worse	21	26.6	7	9.1	2	8.3	4	16.0

[1] Percentages are for columns.

TABLE 2.103: DISTRIBUTION OF FIRMS ACCORDING TO THE QUANTITY OF WORK PERFORMED BY CO-OP STUDENTS COMPARED TO REGULAR EMPLOYEES BY JOB CATEGORY[1]

QUALITY OF WORK PERFORMED BY CO-OP STUDENTS COMPARED TO REGULAR EMPLOYEES	JOB CATEGORY							
	PROFESSIONAL AND TECHNICAL WORKERS		OTHER WHITE COLLAR WORKERS		BLUE COLLAR WORKERS		SERVICE WORKERS	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Better	20	25.6	27	35.1	17	70.8	10	40.0
No Difference	33	42.3	38	49.4	6	25.0	11	44.0
Worse	25	32.1	12	15.6	1	4.2	4	16.0

[1] Percentages are for columns.

response by quality and quantity of work, respectively. Interestingly, it appears that the occupations where co-op students perform best in terms of quality of work are the same as those where they fare best in terms of quantity of work. In Table 2.102, it can be seen that co-op students perform best relative to regular employees as measured by the quality of their work in Blue Collar occupations and worst in Professional and Technical occupations. As Table 2.103 demonstrates, these are the same occupations where the co-op student fares best and worst in terms of quantity of work completed. One explanation for co-op students performing better in Blue Collar occupations is that, in general, they enter the occupation with a much higher skill level of education and/or intelligence.

Finally, the performance of co-op students in these eight skill areas was cross-tabulated by the length of the co-op program, the presence of IV-D funding, and the level of unemployment in the state. All patterns represented no significant difference from the overall pattern in Table 2.101, except for one. The ability to follow instructions was differentiable by length of program, with 2-year co-op students exhibiting better performance relative to regular employees more often than 4-year co-op students. This is consistent with the earlier findings that 4-year students are paid less more often and require more hours of on-the-job training more often than co-op students from 2-year programs.

Another measure of co-op students' performance relative to regular employees was obtained through a question regarding the speed with which co-op students improve their productivity. Co-op employers were asked whether co-op students improve more rapidly than regular employees, whether regular employees improve more rapidly than co-op employees, or whether they improve at the same rate. A summary of the responses to this question appear in Table 2.104. As this table indicates, over 90 percent of the co-op employers reported that co-op students improve more rapidly or at

TABLE 2.104: DISTRIBUTION OF FIRMS ACCORDING TO PRODUCTIVITY IMPROVEMENT OF CO-OP STUDENTS COMPARED TO REGULAR EMPLOYEES[1]

CO-OP STUDENT SPEED OF PRODUCTIVITY IMPROVEMENT COMPARED TO REGULAR EMPLOYEES	NUMBER OF ALL EMPLOYERS	PERCENT OF EMPLOYERS
More Rapidly	126	57.3
Less Rapidly	21	9.5
Same Rate	73	33.2

[1] Percentages are for rows.

the same rate as regular employees. Furthermore, a Chi Square test of these responses shows that a significantly (at a 95 percent confidence level) greater proportion of employers respond that co-op students improve "more rapidly" than respond that co-op employees improve "less rapidly."

This measurement of co-op students' performance relative to regular employees was cross-tabulated by job category of the student, the presence of IV-D funding, the unemployment level, the length of the co-op program, and discipline area. However, none of these cross-tabulations produced a response statistically different from those seen in Table 2.104 (as measured by Chi Square tests at the 95 percent confidence level).

b. Co-op Student Impact on Regular Employees

Information on how co-op students' work impacts on regular employees was derived from several questions asked of co-op employers regarding the benefits of co-op participation. These employers were asked to rate each of the following advantages of co-op as very important, somewhat important, or not important:

- Co-op students increase the motivation and productiveness of regular employees.
- Co-op students perform work which one cannot afford to have regular employees do.
- Co-op students supplement well the work of regular employees.

Table 2.105 provides a summary of the responses obtained. As this table indicates, the most beneficial aspect of co-op students interaction with other employees is that co-op employees supplement well the work of regular employees. Nearly four-fifths of the co-op employers viewed this as either somewhat or very important. Over half of the employees responded that co-op students were at least somewhat important in increasing the motivation and productivity of regular employees. Less than two-fifths indicated, however, that co-op students performed work that regular employees could not.

TABLE 2.105: DISTRIBUTION OF FIRMS ACCORDING TO THE IMPORTANCE OF THE BENEFICIAL IMPACT OF CO-OP STUDENTS ON REGULAR EMPLOYEES[1]

IMPORTANCE OF BENEFIT	INCREASE MOTIVATION AND PRODUCTIVENESS OF REGULAR EMPLOYEES		PERFORM WORK WHICH ONE CANNOT AFFORD TO HAVE REGULAR EMPLOYEES DO		SUPPLEMENT THE WORK OF REGULAR EMPLOYEES WELL	
	Number	Percent	Number	Percent	Number	Percent
Very Important	60	26.3	53	23.5	92	40.9
Somewhat Important	64	28.1	33	14.6	86	38.2
Not Important	104	45.6	140	61.9	47	20.9

[1] Percentages are for rows.

The responses of co-op employers to each of these questions concerning the beneficial impact of co-op students on regular employees were cross-tabulated by the type of firm, the presence of IV-D funding, the job category of the students, the level of unemployment, the length of the program, the length of time the firm has employed co-op students, and the discipline area. The most frequent question to yield a pattern of responses statistically different (as measured by a Chi Square test at the 95 percent confidence level) from that observed in Table 2.105 was the question regarding whether co-op students increase the motivation and productiveness of regular employees. As Table 2.106 indicates, co-op students employed in white-collar jobs, especially in professional and technical occupations, are less likely than co-op students in other occupations to have a beneficial impact on the motivation and productiveness of regular employees. This is probably due to the education and intelligence parity presumed between regular employees in this job category and co-op students, whereas in other job categories the higher levels of education and intelligence may serve as a motivating factor to regular employees.

TABLE 2.106: DISTRIBUTION OF FIRMS ACCORDING TO THE IMPORTANCE OF THE BENEFICIAL IMPACT ON THE MOTIVATION AND PRODUCTIVENESS OF REGULAR EMPLOYEES BY SELECTED CHARACTERISTICS[1]

	LEVEL OF IMPORTANCE					
	VERY		SOMEWHAT		NOT	
CHARACTERISTICS	Number	Percent	Number	Percent	Number	Percent
Job Category:						
Professional & Technical	11	13.6	29	35.8	41	50.6
Other White Collar	28	35.4	13	16.5	38	48.1
Blue Collar	9	36.0	9	36.0	7	28.0
Service	11	40.7	9	33.3	7	25.9
Length of Program: 2-years	47	37.0	24	18.9	56	44.1
4-years	13	12.9	40	39.6	48	47.5
Length of Firm Participation:						
≤3 years	13	52.0	5	20.0	7	28.0
4-5 years	6	35.3	3	17.6	8	47.1
6-10 years	6	25.0	12	50.0	6	25.0
≥11 years	4	16.7	9	37.5	11	45.8

[1] Percentages are for rows.

At the same time, Table 2.106 shows that employers of co-op students from 2-year programs consider this beneficial impact very important over three times as often as employers of 4-year co-op students, although both rate this beneficial impact as important in about the same proportions. Lastly, from Table 2.106, it is clear that firms with the shortest history of employing co-op students (3 years or less) receive the greatest benefit from co-op students. Table 2.106 shows that almost 52 percent of the firms employing co-op students for three years or less regard the increased motivation and productiveness of regular employees stimulated by co-op students as very important.

In addition, the responses of co-op employers to the question as to whether co-op students perform work that employers cannot afford to have regular employees do yielded a response pattern significantly different (as measured by Chi Square tests at the 95 percent confidence level) from those observed in Table 2.105 when cross-tabulated by the length of time that the firm had employed co-op students. As Table 2.107 indicates, 54 percent of the firms employing co-op students for three years or less to perform work that employers cannot afford to have regular employees perform list this as a very important benefit of co-op participation. This can be interpreted to mean that, over time, co-op students come to be considered as a regular part of the firm's work force rather than a group which is set apart, scrutinized, and used for mainly menial tasks.

TABLE 2.107: DISTRIBUTION OF FIRMS ACCORDING TO IMPORTANCE OF THE BENEFICIAL IMPACT OF CO-OP STUDENTS PERFORMING WORK FIRMS CANNOT AFFORD TO HAVE REGULAR EMPLOYEES DO BY LENGTH OF TIME FIRM HAS EMPLOYED CO-OP STUDENTS[1/]

IMPORTANCE OF BENEFICIAL IMPACT OF CO-OP STUDENTS PERFORMING WORK FIRMS CANNOT AFFORD TO HAVE REGULAR EMPLOYEES DO	LENGTH OF TIME FIRM HAS EMPLOYED CO-OP STUDENTS							
	3 years or less		4 to 5 years		5 to 10 years		11 years or more	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Very Important	14	53.8	3	17.6	2	8.3	1	4.2
Somewhat Important	1	3.8	0	0	5	20.8	6	25.0
Not Important	11	42.3	14	82.4	17	70.8	17	70.8

[1/] Percentages are for columns.

Lastly, the importance of the impact of co-op students supplementing the work of regular employees was found to be significantly different between firms dealing with schools with 2-year as opposed to 4-year programs. Table 2.108 shows that more firms dealing with 2-year programs indicated that this impact was "very important" than did those dealing with 4-year programs. At the same time, however, these same employers also had the largest frequency of "not important" responses. The explanation is that almost half of the firms working with 4-year programs indicated an impact of "somewhat important."

TABLE 2.108: DISTRIBUTION OF FIRMS ACCORDING TO THE IMPORTANCE OF THE BENEFICIAL IMPACT OF CO-OP STUDENTS SUPPLEMENTING THE WORK OF REGULAR EMPLOYEES BY LENGTH OF PROGRAM[1]

IMPORTANCE OF BENEFICIAL IMPACT OF CO-OP STUDENTS SUPPLEMENTING THE WORK OF REGULAR EMPLOYEES	LENGTH OF PROGRAM			
	2-YEAR		4-YEAR	
	Number	Percent	Number	Percent
Very Important	55	44.4	37	36.6
Somewhat Important	37	29.8	49	48.5
Not Important	32	25.8	15	14.9

[1] Percentages are for columns.

2. Recruitment and Hiring Benefits to Co-op Student Employers

The employment of co-op students may provide firms with a steady stream of talented and highly motivated workers who may be viewed as potential permanent employees. Firms may benefit in several ways. Temporary employment with the firm may provide an excellent basis for evaluating job applicants, plus giving the firm the opportunity to actively recruit the co-op students it especially likes. Work experience may increase students' understanding of the firm so that prospects for job satisfaction are increased if co-op students later accept permanent employment. Further, employment of co-op students may increase the visibility of the firm in the college or university, making it more likely that other students as well may apply for future employment. An indirect benefit for recruitment and hiring is that, through contact with co-op students, the employer may be better able to evaluate other recent college graduates as propsective employees.

In this subsection, the following three measures of recruitment and hiring benefits to co-op employers are examined:

- extent co-op participation aids firms in finding permanent employees;
- extent co-op participation aids firms in evaluating college graduates; and
- tendency of co-op students to become permanent employees.

In addition to examining the overall response of co-op employees to these questions, crosstabulations were generated which disaggregated the responses by selected co-op firm and program characteristics. Chi Square tests were used to measure the statistical significance of these results.

a. Co-op Participation as an Aid to Firms in Finding Permanent Employees

One measure of the benefits of co-op participation to recruitment is whether employers view co-op participation as helpful in finding permanent employees. In responding to this question, co-op employers were asked to rate this benefit as very important, somewhat important, or not important. Table 2.109 provides a summary of their responses. As the table indicates, the majority of co-op employers (57.2% view this benefit as very important, while less than 13 percent rated it as not important. Thus, employers view the fact the co-op participation aids them in finding permanent employees as one of the major benefits from participation in co-op.

TABLE 2.109: DISTRIBUTION OF FIRMS ACCORDING TO THE IMPORTANCE OF CO-OP PARTICIPATION AS AID TO FIRMS IN FINDING PERMANENT EMPLOYEES[1]

EXTENT CO-OP PARTICIPATION AIDS FIRMS IN FINDING PERMANENT EMPLOYEES	NUMBER OF EMPLOYERS	PERCENT OF EMPLOYERS
Very Important	131	57.2
Somewhat Important	69	30.1
Not Important	29	12.7

[1] Percentages are for columns.

The responses of co-op employers to this question regarding the recruitment benefits of co-op participation were cross-tablulated by the unemployment level in the state where the firm was located, the size of the firm, the type of firm, the presence of IV-D funding and the length of the program. The cross-tabulations that yielded variations from the response pattern observed for all employers that were statistically significant (as measured by a Chi Square test at the 95 percent confidence level) were those by firm size and length of program. As Table 2.110 indicates, larger firms consider the benefit of co-op students aiding them to find permanent employees as a more important benefit than smaller firms. Nearly two-thirds of the firms with 500 or more employees view this aid to recruitment as very important, while only 45 percent of the firms employing 30 people or fewer consider it as such. This undoubtedly reflects the increased amount of hiring and recruiting in larger companies. At the same time, an examination of the responses by length of program produces a

TABLE 2.110: DISTRIBUTION OF FIRMS ACCORDING TO THE IMPORTANCE OF CO-OP PARTICIPATION AS AID TO FIRMS FINDING PERMANENT EMPLOYEES BY FIRM SIZE AND LENGTH OF PROGRAM[1]

	LEVEL OF IMPORTANCE					
	VERY		SOMEWHAT		NOT	
CHARACTERISTICS	Number	Percent	Number	Percent	Number	Percent
Number of Employees:						
1-30 Years	29	42.6	27	39.7	12	17.6
31-150 Years	30	60.0	9	18.0	11	22.0
151-499 Years	18	59.5	10	30.3	5	15.2
500 Years	45	66.2	22	37.4	1	1.5
Length of Program:						
2-Years	67	52.3	47	36.7	14	10.9
4-Years	64	63.4	22	21.8	15	14.9

[1] Percentages are for rows.

mixed picture. Clearly, more firms hiring co-op students from 4-year programs consider this benefit "very important" more often than those hiring from 2-year programs, but the response is reversed when considering "very important" and "somewhat important" combined.

b. Co-op Participation as an Aid to Firms in Evaluating College Graduates

One important element of recruiting is evaluating college graduates as prospective permanent employees. To test whether co-op participation assisted employers in this area, they were asked if co-op participation aided them significantly, somewhat, or not at all in evaluating recent college graduates as prospective permanent employees. The responses received are summarized in Table 2.111. Based on these results, it appears that most employers (73.7%) view co-op participation as helpful in evaluating college graduates. However, this recruitment benefit appears important to fewer employers than did the aid which co-op participation in and of itself provides in finding permanent employees (Section IV.2.a).

TABLE 2.111: DISTRIBUTION OF FIRMS ACCORDING TO WHETHER CO-OP PARTICIPATION AIDS IN EVALUATING COLLEGE GRADUATES[1/]

EXTENT CO-OP PARTICIPATION AIDS FIRMS IN EVALUATING COLLEGE GRADUATES	NUMBER OF EMPLOYERS	PERCENT OF ALL EMPLOYEES
Significantly	85	37.3
Somewhat	83	36.4
Not at all	60	26.3

[1/] Percentages are for columns.

The responses of co-op employers to this question regarding the rectuitment benefits of co-op participation were cross-tabulated by type of firm, job category of the student, the presence of IV-D funding, the level of unemployment in the state, the length of the co-op program, and discipline area. None of these tabulations yielded response patterns that were significantly different (as measured by Chi Square tests at the 95 percent confidence level) from that for all co-op employers.

c. Tendency of Co-op Students to Become Permanent Employees

One important way in which co-op participation can facilitate recruitment efforts on the part of the firms is via co-op students becoming permanent employees upon graduation. Of course, to the extent that this occurs, the firm's recruitment costs for that employee are virtually zero. In order to measure the frequency with which this phenomenon occurs, employers were asked what percentage of their co-op student employees become permanent employees upon graduation. The responses to this question indicated that an average of 37.7 percent of the co-op students, or nearly two students in five, remain with the firm upon graduation.

To examine differences which may arise in the mean proportion of students remaining with a firm, responses to this question were broken down by job category of the student, the length of the co-op program, discipline area, the presence of IV-D funding for the program, average length of time the student remains with a firm, the unemployment level of the state, and size of the firm. The breakdowns by length of time a student remains with a firm and by level of unemployment in the state, produced significantly different (as measured by F-ratios) means. As Table 2.112 indicates, the longer a co-op student works for a firm as an undergraduate, the greater the likelihood that he will become a permanent employee with the firm. In fact, over half (53.2% of the undergraduate co-op students that stay with a firm for more than a year become permanent employees with that firm upon graduation. At the same time, those firms located in low unemployment areas (areas with tight labor markets) increase their hiring of co-op employers as permanent employees, thereby utilizing co-op students as a visible and ready supply of labor. Both of the above findings speak well for co-op participation as an effective recruiting mechanism.

TABLE 2.112: TENDENCY OF CO-OP STUDENTS TO BECOME PERMANENT EMPLOYEES BY LENGTH OF TIME STUDENT REMAINS WITH A FIRM AND LEVEL OF UNEMPLOYMENT IN THE STATE

CHARACTERISTICS	PERCENT OF CO-OP STUDENTS THAT BECOME PERMANENT EMPLOYEES
Length of Time with Firm:	
1-6 Months	26.6
7-12 Months	40.3
13 Months	53.2
Unemployment Level: High	31.2
Low	45.8

1/Percentages are for columns.

3. Community Relations Benefits to Co-op Employers

A third broad area of "payoff" to a firm that participates in co-op is community relations. In this area, the jobs for which students are employed or the numbers of student employees are probably less important than the fact that the firm participates in a co-op program. The importance to firms of public relations type benefits are examined in this section through responses by co-op employers to several related questions. Co-op employers are asked if they view the following benefits from co-op participation as very important, somewhat important, or not important:

- improves communications with schools, makes them more responsive to needs of business;
- is good for public relations, enhances visibility of firm; and
- provides a valuable community service.

Variation in the importance co-op employers attach to each of these benefits is examined by length of time firm has employed co-op students, unemployment in the state where the firm is located, and by the size and type of firm.

a. Co-op Participation and School's Responsiveness to Needs of Business

One advantage of co-op participation cited by employers is that it improves the communications between schools and businesses and tends to make the schools more responsive to the needs of business. To measure the importance of this benefit to employers, they were asked to rate it as very important, somewhat important, and not important. A summary of their responses appears in Table 2.113. As the table indicates, about two-thirds of the employers view this as a very important benefit, and 93 percent consider it at least somewhat important. Thus, most employers who participate in co-op believe that the co-op program is a step toward schools responding to their needs.

TABLE 2.113: DISTRIBUTION OF FIRMS ACCORDING TO THE IMPORTANCE OF CO-OP PARTICIPATION TO THE RESPONSIVENESS OF SCHOOLS TO BUSINESS NEEDS[1]

IMPORTANCE OF CO-OP PARTICIPATION IN AIDING THE RESPONSIVENESS OF SCHOOLS TO BUSINESS NEEDS	NUMBER OF EMPLOYERS	PERCENT OF EMPLOYERS
Very Important	153	66.8
Somewhat Important	60	26.2
Not Important	16	7.0

[1] Percentages are for columns.

Cross-tabulations of co-op employers responses to this question and the type of firm, size of firm, presence of IV-D funding, length of school program, level of unemployment in the state, and length of time the firm had employed co-op students were examined. Chi Square tests were used to determine if the pattern of responses obtained by these firm characteristics were significantly different from that for all employers. Only one of these cross-tabulations indicated a significantly different distribution at the 95 percent confidence level: the unemployment rate in the state. Table 2.114 shows that cooperative education is viewed as a "very important" aid to the responsiveness of schools to business needs more often in low unemployment areas, although firms in these areas also report with high frequency that it is not an important aid. The reason for this finding is that a very low proportion of firms in low unemployment areas regard this role of cooperative education as only "somewhat important."

TABLE 2.114: DISTRIBUTION OF FIRMS ACCORDING TO THE IMPORTANCE OF CO-OP PARTICIPATION TO THE RESPONSIVENESS OF SCHOOLS TO BUSINESS NEEDS BY LEVEL OF UNEMPLOYMENT[1]

IMPORTANCE OF CO-OP PARTICIPATION IN AIDING THE RESPONSIVENESS OF SCHOOLS TO BUSINESS NEEDS	LEVEL OF UNEMPLOYMENT			
	HIGH		LOW	
	Number	Percent	Number	Percent
Very Important	81	63.3	72	71.3
Somewhat Important	42	32.8	18	17.8
Not Important	5	3.9	11	10.9

[1] Percentages are for columns.

b. Effect of Co-op Participation on Public Relations

In order to examine the extent of this advantage to participation in co-op, employers were asked if they considered the benefit co-op offered in terms of enhanced public relations as very important, somewhat important, or not important. The results of this inquiry are provided in Table 2.115. As the table indicates,

TABLE 2.115: DISTRIBUTION OF FIRMS ACCORDING TO THE IMPORTANCE OF CO-OP PARTICIPATION TO IMPROVED PUBLIC RELATIONS[1]

IMPORTANCE OF CO-OP PARTICIPATION IN IMPROVING PUBLIC RELATIONS	NUMBER OF EMPLOYERS	PERCENT OF EMPLOYERS
Very Important	123	53.2
Somewhat Important	73	31.6
Not Important	35	15.2

[1] Percentages are for columns.

the majority (53.2%) of employers viewed this as a very important benefit to co-op participation, and only about 15 percent considered it not important. In sum, it appears that the general public takes a favorable view of co-op, and this view is transmitted to individual co-op employers.

Cross-tabulations of co-op employers responses to this question and the type of form, size of firm, presence of IV-D funding, length of program, level of unemployment, and average length of time the firm has employed co-op students were examined. The only cross-tabulation that yielded significant results as measured by Chi Square tests at the 95 percent confidence level was that by size of firm. As Table 2.116 indicates, firms employing between 151-499 persons tend to view the improved public relations attributable to co-op participation as very important (74.3%), while larger and smaller firms attached less importance to it. However, it should be noted that for each firm size, four-fifths or more of the firms attached some importance to the improved public relations.

TABLE 2.116: DISTRIBUTION OF FIRMS ACCORDING TO THE IMPORTANCE OF CO-OP PARTICIPATION TO IMPROVED PUBLIC RELATIONS BY FIRM SIZE[1]

IMPORTANCE OF CO-OP PARTICIPATION AS AN IMPROVEMENT TO PUBLIC RELATIONS	NUMBER OF EMPLOYEES (FIRM SIZE)							
	1-30		31-150		151-499		500 or more	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Very important	37	55.2	28	53.8	26	74.3	28	41.2
Somewhat Important	16	23.9	16	30.8	6	17.1	32	47.1
Not Important	14	20.9	8	15.4	3	8.6	8	11.8

[1] Percentages are for columns.

c. Co-op Participation as a Community Service

Co-op employers were also asked to what degree they benefited from co-op programs to the extent that these programs provide a valuable community service. The co-op employers were requested to rate the level of benefit as very important, somewhat important, or not important. The results of this inquiry are presented in Table 2.117. Again, the majority (62.1%) of co-op employers rated this benefit as very important, and 94 percent rated it as either somewhat important or very important. One might hypothesize that co-op employers are providing a service to the community at large, in that they are facilitating the transition from "student" to "worker," and are helping students work their way through college.

TABLE 2.117: DISTRIBUTION OF FIRMS ACCORDING TO THE IMPORTANCE OF CO-OP PARTICIPATION AS A COMMUNITY SERVICE[1/]

IMPORTANCE OF CO-OP PARTICIPATION AS A COMMUNITY SERVICE	NUMBER OF EMPLOYERS	PERCENT OF EMPLOYERS
Very Important	144	62.1
Somewhat Important	74	31.9
Not Important	14	6.0

[1/] Percentages are for columns.

The responses on the part of co-op employers were cross-tabulated by the type of firm, length of program, size of firm, the average length of time firm has employed co-op students, and the level of unemployment in the state. Only the cross-tabulation by length of program yielded a pattern of response that was significantly different from those for all employers (as measured by Chi Square tests at the 95 percent confidence level). Table 2.118 clearly shows that firms employing students from 2-year co-op programs regard co-op participation as more important as a community service than firms hiring students from 4-year co-op programs.

This may be a result of the more vocational nature (and health orientation) of 2-year programs.

TABLE 2.118: DISTRIBUTION OF FIRMS ACCORDING TO THE IMPORTANCE OF CO-OP PARTICIPATION AS A COMMUNITY SERVICE BY LENGTH OF PROGRAM[1]

IMPORTANCE OF CO-OP PARTICIPATION AS A COMMUNITY SERVICE	LENGTH OF PROGRAM			
	2-YEAR		4-YEAR	
	Number	Percent	Number	Percent
Very Important	90	69.2	54	52.9
Somewhat Important	35	26.9	39	38.2
Not Important	5	3.8	9	8.8

[1] Percentages are for columns.

4. Summary

Based on the responses of co-op employers described in Sections IV.C.1 - IV.C.3, it appears that employers benefit from co-op participation in all three areas examined--worker productivity, recruitment, and community relations. In seven of the eight skill measures examined, co-op students performed significantly better than regular employees. Furthermore, co-op student employees had a positive impact on the productivity of other employees. In terms of recruitment benefits, the majority of employers (57.2%) indicated that a very important benefit of co-op participation was that it aided them in finding potential permanent employees. And lastly, each measure of community relations benefits from co-op indicated that employers found this an important asset. In fact, the majority of employers considered all of the following as very important benefits of co-op: 1) schools responding to business needs, 2) improved public relations, and 3) performing a community service.

In general, the cross-tabulations by firm characteristics did not indicate that the degree of benefit varied widely according to the type of firm. Thus, the benefits accrued to co-op employers are pervasive and generally not concentrated in specific types of firms. These benefits are compared and contrasted with the earlier findings with regard to the costs to co-op employers in the next section. In addition, several independent measures of net benefits are examined in the next section.

D. Net Benefits to Co-op Student Employers

In this section, employers' net benefits or net gains from co-op participation are examined. Because few, if any, of the costs and benefits to firms employing co-op students can be quantified, a comparison of costs and benefits involves more than simple addition or subtraction. Thus, a twofold approach is taken in this section. First, the costs and benefits described in detail in Section IV.B and IV.C are compared and conclusions are drawn based on this summary. Second, several indirect indications of firms' overall experiences with co-op are examined. For example, employers' plans to continue or expand their co-op participation are used as an indication of how they view the net benefits of participation in co-op.

1. Co-op Student Employer Costs and Benefits Compared

The investigation of costs incurred by co-op employers that was described in Section IV.B revealed that only two types of costs (start-up and evaluation costs) were higher, and only one cost (compensation) was lower, for co-op employees than for non-co-op employees. All other cost items (supervision, union negotiations, customer relations, employee turnover) indicated no differences between co-op and non-co-op employees. Start-up costs--those costs related to negotiations with co-op schools upon initiation of a co-op program--are by definition associated only with co-op schools and are generally not large (on average about 5 hours per school). The extent to which evaluation costs for co-op employees exceed that for non-co-op employees was not measurable from the available data. However, since no appreciable difference in evaluation costs was seen between co-op and non-co-op employees when co-op students have been with the firm for more than a year, one may safely assume that the overall difference is not large.

The examination of co-op employer costs also revealed that employers tend to pay co-op student employees less than regular employees. This lower compensation included vacation and sick leave and other fringe benefits, as well as lower wages. On balance then, in spite of the lack of any quantitative measure of these costs, one can readily say that co-op students cost employers less than regular employees. One obvious response to the lower compensation observed for co-op employees relative to regular employees is that if one considers the productivity of each, then the compensation difference will be explained by lower co-op student productivity. Yet, when one compares the productivity of co-op students relative to regular employees (one of the benefit items examined), one finds quite the opposite--co-op students performed *better* than regular employees in seven of the eight skill areas examined. In fact, the co-op student employees performed sufficiently well to increase the motivation and productiveness of other employees.

A separate analysis of the benefits of employer participation in cooperative education identified positive benefits in two other important areas. In terms of recruitment, the majority of employers indicated that a very important benefit of co-op participation was that it aided them in finding potential permanent employees. This recruitment benefit (i.e., lower recruitment cost) was particularly important to larger firms. In fact, two-thirds of the firms that employ 500 or more persons reported that finding potential permanent employees was very important to them, and over 98 percent responded that it was at least somewhat important. In the area of community relations, the majority of employers reported that their participation in co-op was a very important benefit to them. This was the case in every aspect of community relations--community service, public relations and schools responding to the needs of business.

To summarize both the costs and the benefits, the data presented in this report indicate that the costs to employers of participation in co-op are minimal, while the benefits are numerous. The additional costs, start-up costs, and evaluation costs incurred by co-op employers are probably more than offset by the reduced compensation costs and increased productivity due to the hiring of co-op students. In addition, the employer who participates in co-op is likely to receive important benefits in the areas of recruitment and community relations. Thus, it appears that the net benefits to employers who participate in co-op are substantial and that co-op students are a sound, economical source of manpower for these employers.

2. Employers' Plans for Future Participation in Co-op Programs

Another approach to the measurement of the costs and benefits to employers of participation in co-op is to examine their decisions for future participation in co-op. Presumably, employers who believe that net benefits are derived from co-op participation will continue to participate or will increase the extent of their participation. Likewise, those employers who do not feel that any net benefits are derived from co-op participation will choose to discontinue their participation in co-op. Thus, in this section, co-op employers' plans to continue in the program or expand their participation in the co-op program are examined.

Co-op employers were asked explicitly whether or not they planned to continue with the co-op program. The results of this inquiry are presented in Table 2.119 . The results, as shown in the table, indicate that the overwhelming majority (96.5%) of co-op employers plan to continue their co-op program. These results suggest that co-op employers, in general, are quite satisfied with the program and probably view it as beneficial on net.

TABLE 2.119: DISTRIBUTION OF CO-OP EMPLOYER PLANS TO CONTINUE PARTICIPATION[1]

CO-OP PARTICIPATION PLANS OF EMPLOYERS	NUMBER OF EMPLOYERS	PERCENT OF EMPLOYERS
Continue Program	222	96.5
Discontinue Program	8	3.5

[1] Percentages are for columns.

The responses to this question on future participation were cross-tabulated by size of firm, type of firm, length of program, job category of the students, the presence of IV-D funding, level of unemployment in the state, and discipline area. None of these cross-tabulations yielded response patterns significantly different from that shown in Table 2.119 (as measured by Chi Square tests at the 95 percent confidence level). Thus, it appears that regardless of the characteristics of the employers, they plan to continue their participation in co-op.

In a separate question, co-op employers were asked if they planned to expand the number of positions open to co-op students. The responses to this question are provided in Table 2.120. As the table indicates, more than two out of five co-op employers (41.1%) plan to expand their participation in co-op via opening new positions for students. While the proportion of co-op employers that reported that they do not intend to expand their participation in co-op (58.9%) may at first glance appear to have a negative connotation, one must remember that the creation of additional positions for co-op students is not simply a function of the firm's view of the co-op program. In other words, a firm may be overwhelmingly in favor of co-op, but it may already have hired what it views as being the optimal number of co-op employees. In fact, when the employers responded as to why they did not intend to increase the number of positions open to co-op students, nearly two-thirds (63.5%) cited either economic factors or lack of need for additional employees as the reason.

TABLE 2.120: DISTRIBUTION OF CO-OP EMPLOYER PLANS TO INCREASE PARTICIPATION IN CO-OP[1]

EXPANSION OF CO-OP PROGRAM PLANNED	NUMBER OF EMPLOYERS	PERCENT OF EMPLOYERS
Yes	92	41.1
No	132	58.9

[1] Percentages are for columns.

The responses of employers to the question regarding expansion of co-op programs were cross-tabulated by the size of the firm, length of program, type of firm, presence of IV-D funding, job category of the student, discipline area, and level of unemployment in the state the school is located. Only the cross-tabulation by length of employment, however, yielded a response pattern significantly different from that shown in Table 2.120 (as measured by Chi Square tests at the 95 percent confidence level). As seen from Table 2.121, almost half of the firms hiring co-op students

TABLE 2.121: DISTRIBUTION OF CO-OP EMPLOYER PLANS TO INCREASE PARTICIPATION IN CO-OP BY LENGTH OF PROGRAM[1]

EXPANSION OF CO-OP PROGRAM PLANNED	LENGTH OF EMPLOYMENT			
	2-YEAR		4-YEAR	
	Number	Percent	Number	Percent
Yes	60	48.4	32	32.0
No	64	51.6	68	68.0

[1] Percentages are for columns.

from 2-year programs plan to increase their level of participation, whereas only one-third of the employers hiring 4-year co-op students indicated plans for expanded participation. This is consistent with the high degree of importance attached to co-op participation as a community service by the firms hiring 2-year program students.

3. Co-op Employers Assessment of Quality of Co-op Programs

One additional method of determining how employers view participation in co-op is through a question which asks them to rate the overall quality of the co-op program. The final question asked of co-op employers was, in fact, to rate the quality of the co-op program on a scale from 1 to 5 (5 being excellent). Results of this question are provided in Table 2.122 . As the table indicates, 97 percent of the employers rated the quality of the co-op program as average (3) or better, and 87 percent of the employers rated the quality of the co-op program above average (4) or excellent (5). Furthermore, almost half (48.5 percent) of the employers considered the quality of the co-op program to be excellent (5), and less than 1 percent rated the quality of the co-op program as poor (1).

TABLE 2.122: DISTRIBUTION OF CO-OP EMPLOYER ASSESSMENTS OF THE QUALITY OF THE CO-OP PROGRAM

QUALITY OF THE CO-OP PROGRAM	NUMBER OF EMPLOYERS	PERCENT OF EMPLOYERS
Excellent (5)	112	48.3
Above Average (4)	89	38.4
Average (3)	24	10.3
Below Average (2)	5	2.2
Poor (1)	2	.9

[1] Percentages are for columns.

These responses were cross-tabulated by the size of the firm, the type of firm, the level of unemployment in the state, the presence of IV-D funding, the length of the co-op program, the job category of the students, and the discipline area. None of these cross-tabulations yielded response patterns that were statistically different from those shown in Table 2.122 (as measured by Chi Square tests at the 95 percent confidence level). Therefore, regardless of the firm's characteristics, it was generally expressed that the quality of the co-op program was very good.

In sum, all the measures examined in this section (Section IV.D) suggest that employers view participation in co-op as a very beneficial undertaking. As noted in the discussion of costs and benefits (Section IV.D.1), the costs incurred by co-op employers are minimal compared to the potential benefits. Likewise, the high proportion of firms that currently participate in co-op and plan to continue to do so (96.5 % speaks to the overall satisfaction of employers with the program. And finally, when the employers were asked directly to rate the overall quality of the program, more than four out of five (86.7%) rated it above average, whereas less than 1 percent indicated that they were dissatisfied with the quality of the co-op program. While there may be some bias introduced in these findings as a result of sampling, only those firms participating with each sampled school which employed the greatest numbers of co-op students, the bias is not felt to be large. In any event, the findings are such that they are seen as both significant and dramatic in any light.

V. SUMMARY OF COST-BENEFIT ANALYSIS FINDINGS

The purpose of this final section is to summarize the major findings of the previous four sections of Chapter 2. The discussion which follows will be oriented toward related issues rather than the four previous sections, however. In addition, some of the findings will be repeated in other chapters of the report where the relevant issues are discussed at length (e.g., national potential, career education, Federal effectiveness). The key findings summarized here have to do with the economic returns to cooperative education, the usefulness of the cooperative education program as a financial aid device, the impact of cooperative education on minorities (including veterans), and the impact on the enrichment of the educational experience.

A. Economic Returns to Co-op Participation

1. Individuals

In Section I, the rate of return to individuals who participated in the cooperative education program were compared with those of individuals who did not participate. It was clearly shown that the returns to postsecondary education were enhanced by participation in a cooperative education program. In fact, the returns are such that co-op participation was found to be financially rewarding even when such participation resulted in an additional year of schooling being required for graduation. At a discount rate of 10 percent, the mean present value of a co-op education was about $8,000 greater than the present value of a non-co-op education, although considerable variation was observed among the student type-discipline area-program length combinations. The highest returns were consistently observed in 4-year, rather than 2-year programs; and in the discipline areas of Business & Management and Engineering & Architecture, rather than Health Professions and Liberal Arts.1/

Care was taken to examine the basis for these rate of return findings. The question was asked "to what extent were these returns due to the student experience as opposed to the graduate experience?" The final part of Section I examined the graduate

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1/The findings with respect to sex are described in Subsection V.C.1, below.

experience and found it consistent with the rate of return calculations. That is, a large part of the returns to co-op participation was due to higher graduate earnings, to a reduction in the period necessary to find the first job, and to a lower probability of encountering periods of unemployment of six weeks in length or more. No tendency was found for graduate salaries of co-op participants to grow any faster or any slower than those of non-co-op participants, i.e., the initial salary differential was maintained.

By the same token, Section II revealed that the student experience was also consistent with the rate of return findings. Co-op students had much more favorable ratios of pecuniary benefits to costs during the school years than did non-co-op students, so that a large part of the total economic advantage of the co-op program can be attributed to the student experience. Calculations in Section II have indicated that when considering the first seven years of experience in a four-year program (four student years and three graduate years), the student gains (in undiscounted dollars) represent approximately 44 percent of the total gain. Using this ratio, the average gain of $8,000 in present value for a co-op program can be attributed to the two experiences as indicated in Figure 2.3. Clearly, from the participant's point of view, the co-op experience is almost as valuable as an educational financing mechanism as it is an earnings enhancement mechanism.

2. Employers

In Section IV of this chapter, an analysis was undertaken of the costs and benefits from the point of view of employers of cooperative education students. An examination of costs revealed that only the program's start-up costs and the employee evaluation costs were likely to be higher for co-op employees than for regular employees. The start-up cost is higher by definition, whereas the typical evaluation cost was found to be present only during the first year of employment.

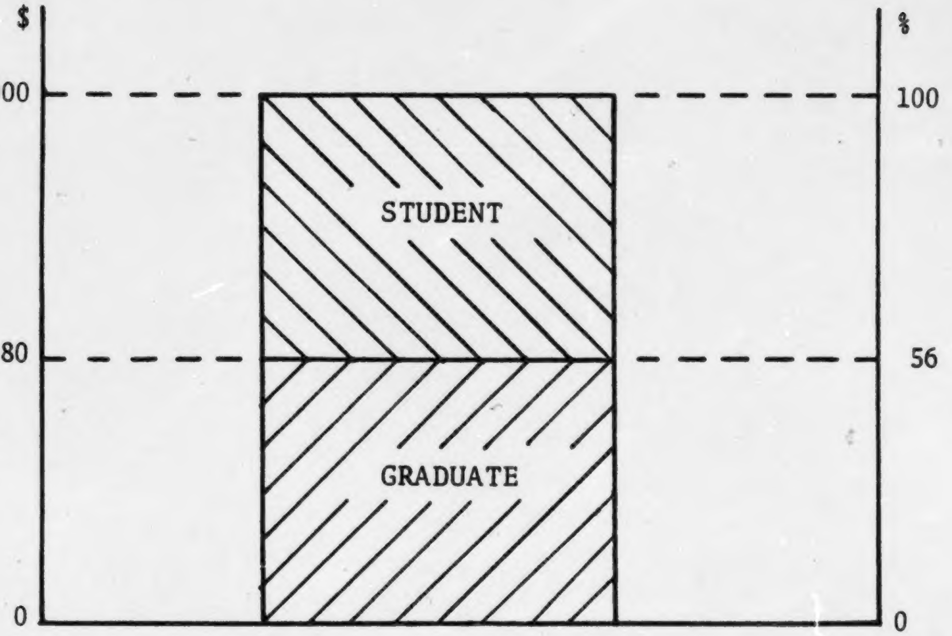

FIGURE 2.3: APPROXIMATE DISTRIBUTION OF AVERAGE CO-OP PRESENT VALUE GAINS BETWEEN THE STUDENT AND THE GRADUATE EXPERIENCES

Counterbalancing these higher costs were two categories of lower cost. The compensation of co-op employees was found to be consistently lower for regular employees, and co-op participation was indicated as an important contributor to the reduction in employee recruitment costs. Participation in a cooperative education program provides a ready source from which to recruit permanent employees, and provides a low-cost pool of labor in the meantime.

While other costs (such as supervision, customer relations, employee turnover, and union negotiations) were found to be no different for co-op employees than for non-co-op employees, two additional benefits of the co-op program were identified, namely: the generally higher productivity ratings for co-op employees (in spite of the generally lower compensation), and the program's value to the firm in terms of community relations. The program provides an avenue for the firms to project an image of community service, a vehicle to improve public relations, and a mechanism to transmit the needs of business to the schools.

Thus, on balance, the costs and benefits indicated that, while the costs of co-op participation to the employer are minimal, the benefits (cost savings) are substantial. Therefore, it is not surprising that employers of co-op students rate the co-op program above average in more than four out of five instances, indicate plans to continue their co-op participation in more than 19 out of 20 cases, and plan to expand their co-op participation in almost half of the cases. Clearly, co-op employers view co-op students as a sound economical source of manpower.

3. Institutions

In Section III of this Chapter, both the annual incremental costs and the benefits to institutions under alternative assumptions or to revenue sources were examined. Clearly, without at least one revenue source, co-op participation can be costly to the institution. An average of $511 is expended per year for each co-op student, although the per student cost declines as the number of students enrolled in the co-op program grows. In no case, was the tuition paid during the co-op work experience sufficient to cover these costs, although tuition did reduce the net cost substantially in the case of private schools.

When considering only those schools receiving them, the annual lump-sum grants covered a larger proportion of the per student co-op costs than did tuition in all but the schools with the largest enrollments. These lump-sum grants were examined separately by IV-D and non-IV-D sources. The results were almost the same for all lump-sum funding combined as for each lump-sum source separately because few schools received both types of grants simultaneously. Clearly, IV-D funding fills an important revenue gap for institutions with co-op programs.

When considering all funding sources combined, the revenue thereby generated is sufficient to cover the incremental co-op costs for almost all institution types. Only the institutions with medium-sized programs seem to run the risk of not covering costs. The small program costs are adequately covered by the combination of tuition and lump-sum funding. At the same time, the costs of large programs are covered because tuition revenue increases proportionately with program size while costs increase less than proportionately. Those programs of medium size, however, have their lump-sum grants spread over enough students so that tuition is left to cover costs which are still at a high per student level.

The above implications hold even when the initial program set-up costs are amortized into the annual cost figures. Such costs are just not large enough under these circumstances to significantly alter the findings. It is probably that the inclusion of Average Daily Attendance, however, would significantly improve the overall financial picture of participating institutions, at least for public schools.

B. The Co-Op Program as a Financial Aid Mechanism

It was pointed out earlier that Section II of the report addressed the question of the usefulness and importance of co-op earnings to the individual student in terms of providing necessary education funding (and improving the expected return to such an educational investment). The finding was that such was the case particularly in terms of non-White and female student participants (see below). The question still remains, however, as to the viability of the cooperative education program as a financial aid mechanism from a Federal point of view. While the subject has been discussed earlier in Chapter 1 and will be further discussed in Chapter 4 when examining Federal Effectiveness, some insight to this question can be provided at this time.

In 1975-76 there were approximately 200,000 students participating in cooperative education programs, 70,000 of which are in programs that are receiving IV-D funding.[1] Total IV-D funding is running at an annual level of about $10,000,000, and the students enrolled in IV-D programs are averaging about $1900 annually in co-op earnings (as tabulated from this study). The question is whether an alternative use of these IV-D funds (say, for student loans) would be more effective than their current use in the co-op programs. If low interest loans were made to co-op students in amounts equivalent to their present co-op earnings, how would the annual interest cost and the annual default cost compare with the total sum currently being spent in the form of IV-D funding?

Considering only the students enrolled in IV-D funded programs, the annual interest cost on the $133,000,000 in student loans ($1900 x 70,000) is calculated as the difference between the market rate of interest (assumed to be 12%) minus the rate of interest actually charged the students (assumed to be 7%) times the loan principal, or $6,650,000 ($133,000,000 X .05).[2] The typical default rate on student loans has been fluctuating between 8 and 14 percent. Taking the lower default rate, the annual default cost on a total loan amount of $133,000,000 would be $11,384,800 (i.e., 8 percent of the total loan principal plus the 7 percent interest lost on the total default). Thus, the total annual cost of the student loans would be $18,034,800 (i.e., $6,650,000 plus $11,384,800).

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[1] Mean Total Co-op Enrollment, as reported in the "Report on Federal Funding Patterns for Cooperative Education Under Title IV-D of the Higher Education Act," November 1976 was 233.8. According to the statistics published by the Cooperative Education Section of the U.S. Office of Education, there were 307 grants for the purpose of administration of co-op programs of IHEs in 1975. Thus, there would be approximately 70,000 students in such IV-D funded programs (233.8 x 307 = 71776.6).

[2] The calculations herein assume that interest payments begin with the loan, whereas interest payments are actually suspended for nine calendar months following graduation. Thus, these figures are biased in favor of the loan program (i.e., they understate the cost to the government) so that the argument remaining _a fortiori_ for the co-op program.

Clearly, the cooperative education program, with its $10,000,000 in annual funding, is a more effective means of providing student financial aid than an equivalent loan program.[1] In fact, the loan default rate would have to be as low as 2.35 percent[2] before the effectiveness of a loan program would be equal to that of the IV-D program given the same interest rate assumptions. On the other hand, even if the student loans were placed at the prevailing market rate of interest, the minimum default rate assumption of 8 percent would lead to a default cost of more than $10,000,000 as calculated above. Considering the other 130,000,000 cooperative education students, for which the costs to the Federal government are negligible, a loan program would have to have a zero default rate and charge the full market interest rate to approach the financial effectiveness of this part of the co-op program. In summary then, the cooperative education program is a very effective means of providing financial aid to students. It is more effective when Federal support is provided to start such programs in the form of IV-D funds, and cannot be matched by any other financial aid mechanism after the program becomes self-supporting.[3]

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[1] The government employs just under 9,000 of the co-op students annually, but since the government receives the equivalent value of services from such employment, the wages paid to the co-op students cannot be considered a net cost to the government of supporting the co-op program in the same sense as the IV-D program. Therefore, such wages were not included in the above calculations.

[2] Calculated as ($10,000,000 - $6,650,000)/1.07 / $133,000,000. This formulation explicitly takes account of the 7 percent interest lost on the defaulted principal.

[3] See the conditions for this event in Section III of this chapter.

C. Financial Impact on Selected Minorities

The cost-benefit analysis of this chapter was able to address three minority groups: women, non-Whites, and those with previous work experience (primarily veterans). It would have been desirable to address the economically disadvantaged as well, but all questions pertaining to parental income were disapproved during OMB review of the preliminary questionnaires. The findings with respect to each of the three minority groups will be summarized in turn.

1. Females

The economic returns for females, as calculated in the rate of return analysis of Section I, were not influenced as much by co-op participation as were those of males. On the other hand, college training in general increased the returns to females more than to males because of their typically lower high school earnings endowments which caused very high non-co-op returns. This combined with the concentration of females in the least financially rewarding co-op program length and discipline areas (2-year programs, Health Professions, and Liberal Arts) caused the small co-op/non-co-op differentials for females. At the same time, while graduate earnings for female co-op graduates tended to increase more rapidly after graduation than earnings for males, no difference in hours of work or labor force participation rates during the first few working years were observed between the sexes regardless of co-op participation.

The student experiences of females as reported in Section II support the findings for graduates in that the student earnings of females were less than males regardless of co-op status, but still large enough to cover the expenses of education. The male-female differential is again in large part due to the concentration of females in the least attractive discipline areas. In any event, the financial status of the female student was improved by virtue of co-op participation, as was the financial status of the female graduates.

2. Non-Whites

Rates of return could not be calculated on the basis of race because of cohort size limitations, but sufficient data were available to examine the graduate and student experiences by race. Because of a high degree of variability in the data, little statistical significance could be shown, but the graduate earnings for Whites were lower than those for Non-Whites in the sample of non-co-op participants, whereas, the relationship was reversed for the sample of co-op participants. This means that co-op participation benefited Whites more than non-Whites. This finding is consistent with the further finding that the elapsed time between graduation and the first job was about the same for each of the races when considering only non-co-op participants, but was decreased as a result of co-op participation for Whites only.

The student experience described in Section II for non-Whites counterbalances the graduate experience somewhat. While non-co-op earnings of non-co-op students are higher for Whites, non-co-op earnings for co-op students (i.e., co-op students often have earnings from non-co-op employers as well as co-op employers over the entire school year) are higher for non-Whites. Since co-op earnings are also higher for non-Whites, it is clear that co-op participation substantially improves the net financial position of non-White students vis-a-vis White students. In fact, the improvement is such that the financial position of non-White students is superior to that of White students as a result of co-op participation. It is doubtful, however, if the student earnings response to co-op participation is large enough to cause the overall returns to co-op participation to be equalized between the races. The lack of response of Non-White graduate earnings to co-op participation creates a much too sizeable White, non-White earnings differential to be compensated for by a reverse differential in student earnings experience.

3. Veterans

During the analysis of Section I, individuals with previous work experience were not included in the rate of return calculations because they were expected to exhibit quite different graduate earnings profiles. This was verified during the graduate earnings analysis where it was also found (as expected) that these individuals were for the most part veterans. The graduate earnings analysis found that, in terms of total graduate earnings, those with previous experience who did not participate in cooperative education programs had about the same earnings as those without previous experience who did participate in cooperative education programs. While the earnings gains for co-op participants were reflected in high starting salaries and the gains for those with previous experience were reflected in larger and more frequent salary increases, the participation patterns for both were similar. That is, both previous experience and co-op participation reduced the time needed to obtain the first job and decreased the probability of incurring periods of unemployment six weeks or more in length.

While the effects of previous experience and co-op participation on the graduate experience were very similar, i.e., were substitutes, the effects were not found to be additive. Apparently, the existence of previous experience renders co-op participation unprofitable, since no additional gain in graduate earnings can be obtained thereby. Thus, one is tempted to conclude that veterans should not participate in co-op programs, and, at first glance, the student analysis of Section II would seem to confirm such a conclusion. Those students with previous experience exhibit the worst cash flow of all the student types. This is a result of the added family responsibilities that these individuals typically have, and occurs in spite of the G.I. benefits received. The attraction of co-op participation on the part of veterans, however, can be seen by comparing the sizeable negative cash flow of those not participating in co-op with the breakeven position of those who do participate in co-op. Co-op earnings just make the difference between breaking even during the student years and going in debt. In other words from a monetary point of view, co-op participation for veterans is almost solely a result of seeking an additional financial aid device during the student years.

D. Non-Economic Returns to Co-Op Participation

Section I examined the levels of job satisfaction, job responsibility, and relevance to career plans associated with a graduate's work experience. While no increase in job satisfaction was associated with co-op participation, some differences in job responsibility were identified, with co-op graduates being given slightly greater job responsibilities. Finally, co-op participation seemed to provide a better match of college experience and job requirements because co-op graduates with several years of work experience continued to view their jobs as significantly more related to their career plans than did non-co-op graduates.[1/]

Section II also provided some important student attitude and experience differences with regard to college experiences. Co-op students expressed a higher overall level of satisfaction with their program than did non-co-op students, although the differential was not strong. On the other hand, a very strong differential was revealed between co-op and non-co-op students regarding the match between the student job and the college major, with a clearly better match being found by co-op participants. Co-op/non-co-op differentials were also observed when describing job satisfaction and performance. While both types of students are asked their opinions about work and are allowed to decide how things should get done, it was found that fewer co-op students can do their jobs without thinking, associate with fellow workers after hours, or require

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[1/] This was not the case of the female dominated 2-year Liberal Arts and Health Professions programs, where the opposite appeared to be the case.

a replacement when absent. Taken together, these findings imply that co-op students are given specialized, non-routine jobs that are postposable and require independent thinking. This is consistent with the finding that co-op students learn new things each day, both at work and after work (not necessarily from fellow workers, however), receive multiple assignments, generally get paid less, and are often told they have done a good job.[1/]

Finally, co-op students were asked their reasons for participating in co-op. The most frequent reason voiced was to achieve a career objective, whereas the added income from such participation was cited the least often. Co-op students were also asked for their quality ratings of the programs. Employer facilities and training, along with the quality of college instruction and overall program quality, received the highest ratings, whereas career counseling received the lowest rating. Interestingly, those in new programs and those with previous experience seem to better appreciate the co-op structure of education. In any case, less than 3 percent of all co-op students indicated that they would not recommend the program to others. Apparently, students have a strong preference for cooperative education.

E. Overview

In sum then, the cost-benefit analysis of this chapter has provided findings on a full range of issues. Clearly, cooperative education is financially rewarding to the individual in both the student and the graduate experiences. It is also viewed as preferable from a quality standpoint. Co-op employers find that participation in a program enhances future recruiting and provides a ready pool of manpower at a reasonable cost. It appears that institutions may avoid losing money when supporting a co-op program by making use of the full range of funding sources available, and may realize

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[1/] From Section I we find that co-op graduates continue to receive multiple job assignments, require replacements when absent less often, and are asked their opinions about the job more often than non-co-op graduates.

substantial gains from doing so. Co-op is beneficial in some respects for a variety of minority groups, and, from the Federal point of view, is an extremely efficient student aid mechanism.

Clearly, more needs to be said regarding Federal effectiveness and career education, and these are the subjects of Chapters 4 and 5, respectively. At the same time, a great deal of information has been provided in this chapter that has implications regarding the potential for expansion of cooperative education programs. Given that co-op is profitable from the viewpoints of all of the participants, does the same degree of profitability hold at the margin, is there room for significant program expansion (i.e., are there any bottlenecks in the system), and to what extent is expansion likely to alter the conditions of profitability in a general equilibrium, dynamic context? These questions will be addressed in the next chapter which is devoted to the topic of national potential.